ONTARIO

Mining, Milling and Refining of Uranium in Ontario

FINAL REPORT

SELECT COMMITTEE ON
ONTARIO HYDRO AFFAIRS

DECEMBER 1980

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SELECT COMMITTEE ON ONTARIO HYDRO AFFAIRS

FINAL REPORT ON THE MINING, MILLING AND REFINING OF URANIUM IN ONTARIO

THE LEGISLATIVE ASSEMBLY OF ONTARIO
FOURTH SESSION: THIRTY-FIRST PARLIAMENT


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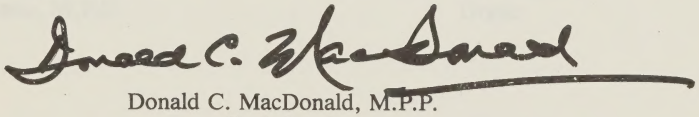
TO: THE HONOURABLE JOHN E. STOKES
Speaker of the Legislative Assembly of the Province of Ontario

Sir:

On behalf of the Members of the Select Committee on Ontario Hydro Affairs appointed by the Legislative Assembly of the Province of Ontario on November 24, 1977, to inquire into various matters relating to Ontario Hydro, I have the honour of submitting the attached report.



Donald C. MacDonald, M.P.P.
York South
Chairman

SELECT COMMITTEE ON ONTARIO AFFAIRS

FINAL REPORT ON THE MINING, MILLING AND REFINING OF URANIUM IN ONTARIO

THE LEGISLATIVE ASSEMBLY OF ONTARIO FOURTH SESSION: THIRTY-FIRST PARLIAMENT

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FINAL REPORT ON THE MINING, MILLING, AND REFINING OF URANIUM IN ONTARIO

TABLE OF CONTENTS

FINAL REPORT ON
THE MINING, MILLING, AND REFINING OF
URANIUM IN ONTARIO

TABLE OF CONTENTS (continued)

APPENDICES

INTRODUCTION

INTRODUCTION

This Select Committee was established by the Legislative Assembly of the Province of Ontario on November 24, 1977 with Mr. Donald C. MacDonald, M.P.P. (York South) as Chairman. The Committee was ordered to examine and report upon a wide range of matters, most of which relate directly to the affairs of Ontario Hydro. The Committee was thus named the Select Committee on Ontario Hydro Affairs; its mandate, however, extends beyond the affairs of Ontario Hydro. The third of its terms of reference (included, in full, as Appendix A) directed the Committee "to examine. . .environmental impact and health considerations related to nuclear power", as part of a comprehensive examination of Ontario's nuclear commitment.

Ontario is unique among Canada's provinces in its total involvement in all steps and all stages of the nuclear industry:

- The biggest operating uranium mines and those supplying most of the fuel for Canadian reactors are at Elliot Lake;
- The only Canadian uranium refinery is at Port Hope.
- One of the world's largest nuclear reactor programs is being built and operated by Ontario Hydro;
- Heavy water, necessary for the operation of CANDU reactors, is produced in Ontario (as well as Nova Scotia);
- And, it is mainly the Ontario section of the Precambrian Shield that is being studied for a possible nuclear fuel waste disposal site.

Thus, in order to examine "Ontario's nuclear commitment", the Committee has examined all aspects of the nuclear cycle. Sixteen weeks of hearings related to the safety of Ontario's nuclear reactors were held between April, 1979 and the tabling of the Committee's final report, The Safety of Ontario's Nuclear Reactors, in June, 1980. The nuclear fuel waste disposal program was studied in October of 1978 and again in the first three months of 1980. The Committee's conclusions and recommendations are contained in another of its reports, The Management of Nuclear Fuel Waste, also tabled in the Legislative Assembly in June, 1980. This report is the Committee's third one dealing with Ontario's involvement in nuclear power. It sets out the findings, conclusions and recommendations of the Select Committee on the mining, milling, refining and conversion of uranium – the main stages in the 'front end' of the nuclear fuel cycle.

In addition to these reports which focus directly on health and environmental effects, the Committee also studied: the long-term contracting for uranium, reporting in March, 1978 on proposed uranium contracts between Ontario Hydro and the two producers at Elliot Lake; the construction of and need for heavy water plants, reporting in October, 1978; and, the overall need for additional electrical generating capacity and consequently the next nuclear station, reporting in December, 1979.

The 'front end' of the nuclear fuel cycle encompasses the diverse range of activities extending from underground mining to chemical refining and conversion. The issues covered by the Committee encompass an equally diverse range, from questions of legal jurisdiction to the standard of safety in underground mines to the disposal of acres and acres of radioactive wastes. As in all its endeavours the Committee had only a limited time to carry out its work.

Hearings began early in July and the Committee came to its conclusions by early October. Fortunately, the Committee was able to build on several industry reviews that had only recently been completed. These included the work of:

- the Royal Commission on Health and Safety in Mines, completed in 1976 with its particular emphasis on uranium mining at Elliot Lake.
- the Ontario Environmental Assessment Board, completed in 1979, dealing with the environmental aspects of the expansion of the uranium mines at Elliot Lake; and
- the Federal Environmental Assessment Review Panel who have conducted three separate reviews – in 1978, 1979 and 1980 – on the siting of proposed new uranium refineries.

The work of these bodies provided a useful background and focus to the work of the Committee, and enabled it to make the most effective use of the short time available for its own investigations.

The Committee spent three days in Elliot Lake to gain a first hand look at uranium mining and milling and the deposition of tailings. In its tour of the companies' facilities the Committee was guided by company officials and union representatives as well as inspectors and field officers from the Ontario Ministries of Labour and of the Environment and the Atomic Energy Control Board (AECB).

In October, the Committee undertook a first hand inspection of both the waste disposal site at Port Granby and the refinery and conversion facility in Port Hope. In addition, the Committee toured the town to acquaint itself with the program for cleaning up the contamination from the operation of a radium refinery until the early fifties and with the problems that still remain. The Committee's tours were guided by officials of Eldorado Nuclear Limited, representatives of the union, representatives from the Atomic Energy Control Board and two private citizen members of the Port Hope Environmental Monitoring Committee. In addition to these tours the Committee held 42 regular meetings in Toronto.

The breadth of views offered by the various guides on the Committee tours is indicative of the approach the Committee takes to its hearings. The Committee seeks out the divergent opinions of any groups or individuals who are a part of, or affected by, the uranium industry, e.g. companies, workers, government officials, residents of nearby towns and involved and informed observers. The Committee's conclusions and recommendations are then based on its own resolution of the often conflicting views of the various witnesses who appear before it. Appendix C lists the witnesses who appeared before the Committee and Appendix D the many documents filed as exhibits.

One of the recurring topics of these hearings was legal jurisdiction. Generally, all nuclear facilities are regulated by the Government of Canada through the Atomic Energy Control Board. However, until only a few years ago, the Atomic Energy Control Board did not concern itself with the health, safety and environmental aspects of the uranium industries. Regulatory and inspection functions that did exist were carried out by provincial officials while the AECB concerned itself primarily with the security of nuclear materials and information.

As the AECB became more involved in regulation, its operating licences began to include a condition that provincial laws and regulations be met. The legal effect of this condition which is now part of every AECB licence is at the least, uncertain. In matters of worker health and safety, Labour Canada has taken the initiative of claiming formal legal jurisdiction while

recognizing the long-standing provincial interest by referencing the Ontario and Saskatchewan acts and regulations for uranium miners working in the respective provinces.

In the environmental area, different approaches have been taken in an attempt to clarify the federal responsibility and provincial interests. Chapter 1 traces the history of the jurisdictional arrangements, outlines the current difficulties and makes recommendations for new approaches.

Underground mining has generally been recognized as a hazardous occupation. Uranium miners face the usual high risks of underground mining plus the undefined risks of working in an irradiated atmosphere and, at Elliot Lake, the danger of working in ore with a relatively high silica content. Efforts have been made to improve working conditions in mines in order to increase the safety of the work environment and fatalities are generally on the decline. For example increased ventilation and improved mining methods have reduced individual exposures to radiation and silica dust. Nevertheless, the Committee found that the mine environment still contains an unnecessary level of hazard, and that more can be done to limit individual exposures to silica and radiation. Chapter 2 sets out the Committee's views on worker health and safety in Ontario's uranium mines.

All mining has consequences for the environment. Both the mining and milling processes require and thereby contaminate substantial amounts of fresh water. In the early years, mines would normally return the contaminated effluents to the local watersheds causing pollution that would, hopefully, not spread too far or cause irreparable damage. In addition, milling processes remove the small quantities of valuable material from the ore (only a few pounds per tonne at Elliot Lake) while leaving vast quantities of waste material – mill tailings – to be deposited on the surface, usually filling a nearby valley or lake. Vast tailings piles of fine dusty or gravelly material, often contaminated by process chemicals are then left behind for nature to cope with. The effects may be either widespread or minimal, depending upon local conditions.

Chapter 3 outlines some of the special environmental problems of mining uranium at Elliot Lake where the tailings contain both radioactive and acid generating elements. It deals with the special long term problems created by this combination of properties and recommends ways to encourage research activity and to ensure the appropriate assignment of long-term responsibility.

All uranium ores refined in Canada are shipped to Port Hope for transformation either to a dioxide form for CANDU reactors or to a hexafluoride form for enrichment and subsequent use in other types of reactors. This latter form, comprising the majority of refined ore is almost exclusively for export. Canadian production of uranium is increasing, and Eldorado Nuclear Limited (Eldorado) has developed plans for building additional capacity to handle more uranium mine concentrates and to upgrade the older parts of its existing plant. Eldorado's latest plan and proposed siting in Port Hope for its new capacity has not been subject to review by the Federal Environmental Assessment Panel, although earlier plans were approved and three of four proposed sites were accepted. Port Hope, Welcome and Port Granby also have the problem of waste from earlier operations of the refinery at Port Hope: from the thirties when radium for medical treatment was being produced, and from the fifties when material for nuclear weapons was being produced.

Chapter 4 includes the Committee's comments on Eldorado's current expansion plan with particular reference to the problem of proceeding without a further hearing before the Federal Environmental Assessment Panel. As well, the chapter reviews the current activities in managing waste sites in and around Port Hope and recommends an approach to a long term solution.

CHAPTER 1

JURISDICTIONAL ARRANGEMENTS

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Over the last decade federal and provincial governments have both introduced increasingly comprehensive legislation to protect the health and safety of workers and to safeguard the environment. Nevertheless, one of the predominant issues before the Committee concerned the adequacy and appropriateness of current jurisdictional arrangements in these areas.

The British North America (B.N.A.) Act generally gives provincial governments jurisdiction in matters of health and safety. In federally regulated industries, however, the federal government has both the responsibility and authority to pass health and safety legislation. Unfortunately, the current arrangement for protecting the health and safety of uranium miners belies the apparent simplicity of this division of responsibility. The Committee learned that uranium miners are protected partly by the Atomic Energy Control Board under the Atomic Energy Control Act and partly by Labour Canada under the Canada Labour Code, while inspectors and specific regulations come from the Ontario Ministry of Labour.

The United Steelworkers of America, representing the uranium miners, have grave reservations about the current jurisdictional arrangement. Management of both Rio Algom and Denison Mines find it unnecessarily complicated and confusing. Further, officials of the Ontario Ministry of Labour consider the situation to be both over-bureaucratic and awkward. The balance of this chapter will outline how the current arrangement developed and the specific problems it creates. It will briefly contrast the arrangement for worker health and safety with those for protecting the environment and then conclude by recommending a more streamlined approach, with the AECB consolidating the federal responsibilities.

ACCOMMODATING PROVINCIAL CONCERNS IN A FEDERAL STATE

The Parliament of Canada, in the preamble of the Atomic Energy Control Act states that it is essential in the national interest to make provisions for the Control and supervision of the development, application and use of atomic energy. The Act asserts federal control over atomic energy from the discovery of uranium bearing ores to the ultimate use of prescribed substances for any purpose. Specifically, Section 17 declares all works and undertakings constructed now or in the future.

> (a) for the production, use and application of atomic energy and
>
> (b) for the production, refining or treatment of prescribed substances to be works for the general advantage of Canada.

Canadian courts have also held that the regulation of atomic energy in all its aspects is within the exclusive legislative jurisdiction of the Canadian Parliament under the peace, order and good government clause in Section 91 of the B.N.A. Act.

Although the AECB was established by this Act in 1946, it did not initially attempt to exercise overall regulatory control over all nuclear facilities. In fact, prior to 1978 there was an implicit understanding that provincial laws governed in respect of the conventional health and safety of all workers in nuclear facilities, including uranium miners. The Atomic Energy Control Board supported the role of the provincial governments by issuing licences stipulating

the necessity of complying with provincial laws. In Ontario, Part IX of the Mining Act and the Employees Health and Safety Act (1976) were the two pieces of provincial legislation that formed the basis of protection for uranium miners.

There also seemed to be an implicit understanding that Ontario's laws governed in respect of radiation health and safety. The most serious health hazards to uranium miners come from a radioactive gas called radon and its radioactive decay products called "radon daughters". On the advice of the Dominion Council of Health, the AECB did include some regulations in licences that were directed toward radiation safety. The AECB did not, however, include specific provisions for "radon daughters" in these regulations leaving unchanged the Ontario Department of Mines target maximum permissible concentration of 1 working level. In 1967, the Ontario Department of Mines issued an order requiring a progressive reduction in maximum permissible exposure to "radon daughters" from twelve working level months (equivalent to a concentration of one working level over 12 months) to four working level months by 1975. It was not until 1976 that the AECB became more deeply involved in the regulation of all aspects of nuclear energy and published its own interim limits for exposure to "radon daughters". In 1978 the interim limits - which were identical to the Ontario 4 WLM level - were made final. There has been no apparent disagreement on either the validity or applicability of these AECB "radon daughter" exposure regulations.

In the area of conventional health and safety, the AECB allowed provincial inspectors to enforce the provisions of the Ontario Act in Ontario's uranium mines. Unfortunately, this arrangement left enforcement powers unclear. For example, it was assumed that if a licensee contravened the conditions in its licence concerning compliance with provincial laws, the licence could be revoked or cancelled. It was also thought possible that the licensee might be liable to prosecution under Section 19 (1) of the Atomic Energy Act. However, it was suspected that there was no way in which the provincial statute itself could be directly enforced, nor was it clear that the provincial inspectors would have the right to insist upon entering the premises for inspection purposes or doing any other act necessary to ensure compliance with the provincial standards.

In 1977, in anticipation of proposed revisions to the Atomic Energy Control Act, the Ontario Ministry of Labour began discussions with federal officials on ways to overcome problems of enforcement and other jurisdictional matters. The prime concern of both federal and provincial officials appears to have been simply to clarify specific responsibilities for the health and safety of workers in uranium mines. Correspondence and minutes of meetings during this time make it apparent that there was a general framework of agreement on the constitutional power of the two levels of government to enact laws in this area. It appears to have been agreed that federal legislation could, by virtue of the legal doctrine of paramountcy, render any provincial laws on occupational health and safety inoperative insofar as uranium mines were concerned. But it was also agreed that the federal power to legislate was a concurrent one shared with the provinces. A concurrent responsibility means, that if there is no conflicting federal legislation, a province could, under certain circumstances, make general employee health and safety laws that are applicable to federal undertakings.

In late 1977, it became clear that the Government of Canada was considering the possibility of assuming responsibility for conventional health and safety in all nuclear facilities when the Atomic Energy Control Act was revised. Labour Canada indicated that it was preparing the appropriate mining health and safety regulations for inclusion in Part IV of the Canada Labour Code. Under the paramountcy doctrine the contemplated federal mining and safety regulations would have rendered the application of the Ontario Mining Act inoperative in relation to Ontario's uranium mines. The Ontario Ministry of Labour resisted this proposal, arguing instead for federal incorporation of provincial laws by reference in order to strengthen the longstanding pattern of allowing provincial laws to govern in the area of the health and safety of uranium mine workers.

The debate between the federal and provincial officials continued behind the scenes and remained unresolved for approximately one year. Then, prior to any new arrangement being put into place, the United Steelworkers of America began to argue that Ontario's uranium miners should be protected by federal legislation. In particular, the Steelworkers sought the safeguards afforded by the provisions of Part IV of the new Canada Labour Code rather than existing provincial legislation.

The Steelworkers were looking for the protection of the new "imminent danger" withdrawal rights provision found in the federal legislation. This was an advanced concept in occupational safety that enabled a worker to refuse to work if he felt the workplace was unsafe. As a result of the Steelworker's entreaties, the Atomic Energy Control Board sought a Department of Justice legal opinion on the applicability of the Canada Labour Code to nuclear facilities. On October 13, 1978 a legal opinion delivered to the legal advisor to the AECB concluded that Part IV of the Canada Labour Code applies to all nuclear facilities including uranium mines and mills. This opinion meant that the existing arrangements developed between the Atomic Energy Control Board and the various provincial ministries could not displace the responsibility of Labour Canada at these facilities. The opinion also stated that while the application of the Code to nuclear facilities was, by its own terms, subject to any other federal statute or regulations thereunder, there was nothing in either of the Atomic Energy Control Act or regulations which displaced the provisions of the Code dealing with an employee's right to refuse work in unsafe conditions or with many other aspects of conventional health and safety.

In essence, the opinion concluded that provincial safety laws do not apply to nuclear facilities except to the extent that these laws have been specifically incorporated into the AECB licences. If they have been incorporated, compliance with the provincial laws becomes a condition of the licences, as long as the incorporated provincial laws do not conflict with any applicable federal laws. As a result of this opinion, the Steelworkers found that they had no choice but to be under the umbrella of the very federal legislation whose protection they had sought.

Several other important consequences flowed from this very important legal opinion. First, it was now clear that the orders issued by the Ontario Department of Mines since 1950 specifying maximum permissible levels to radon daughters were of no legal consequence. Until the AECB issued interim regulations in 1976, no valid legislation protected Ontario's uranium miners from that serious threat to their health. In fact, it was now apparent that all provincial health and safety legislation intended to protect uranium miners was also invalid, although the parties had proceeded, generally, as though the arrangements were binding. In retrospect, the lack of effective legal protection may not have had any practical significance, but this was sheer good fortune. And, the late realization of proper jurisdiction points to the lack of serious attention given to the whole area.

In any event, based on the legal opinion, the Federal Minister of Labour, in reply to a question in the House, stated on December 6, 1978 that "just a week or so ago, my department received a legal opinion from the Department of Justice to the effect that Part IV of the Canada Labour Code does, contrary to former belief, apply to health and safety matters in uranium mines." Shortly thereafter, the Ontario Ministry of Labour requested and received a legal opinion which, in essence, stated that the province has no constitutional power to enact laws designed to protect uranium miners from harmful radium exposure but that it can be "forcefully argued" that the province can make general provincial health and safety regulations applicable to uranium mines if they do not conflict with federal regulations. Stated in other terms, the power to legislate in the field of conventional health and safety is a concurrent one. The Department of Justice and provincial legal opinions differed only with regard to the possible existence of conflicting federal legislation. The provincial opinion was that, in the area of conventional health and safety, it could be argued that provincial laws applied as long as

there was no conflicting federal legislation; the opinion of the Department of Justice appears to have indicated that any provincial legislation would be invalid regardless of the existence of conflicting federal legislation.

As a result of the opinion to which the federal Minister of Labour referred in Parliament and in light of the opinion which the Ontario Ministry of Labour had received, a meeting was arranged in January, 1979, between the federal Minister and Deputy Minister of Labour and their Ontario counterparts. At that meeting, Labour Canada made it quite clear to the provincial government that the question of concurrent jurisdiction was academic. The Government of Canada fully intended to occupy the field in respect of conventional health and safety for uranium miners under Part IV of the Canada Labour Code with its own legislation to the exclusion of provincial legislation. The Government of Ontario was forced to accept this position.

Labour Canada thus found itself responsible for the health and safety of uranium mine workers but without appropriate legislation, staff expertise or field inspection to handle the new situation. After consulting with all the affected parties, Labour Canada, in August, 1979 took the temporary measure of making the conditions of Part IX of the Ontario Mining Act a federal law regulating Ontario's uranium mines. In so doing, Labour Canada was fully aware that Bill 70, a new and more comprehensive Ontario health and safety act, was about to be passed. Labour Canada representatives pointed out to the Committee, however, that Bill 70 had been "hanging fire" for some time and that in the interim, it was absolutely necessary to have some legislation in place to adequately regulate the uranium mines.

The United Steelworkers had always pursued a simple objective: to assure their workers of the best possible occupational health and safety protection. They immediately sought to improve upon the regulations of Part IX of the Ontario Mining Act now incorporated into the Canada Labour Code. In July, 1979, the Steelworker succeeded in having a tripartite working party formed to draft a new and comprehensive set of uniquely federal health and safety regulations. This working party, composed of representatives of Labour Canada, the employers and the union, finalized a working draft, on schedule, by March, 1980. In April 1980, however, the United Steelworkers of America advised Labour Canada that it now believed that its objective could best be met if jurisdiction were to lie with the provincial government. The union thus refused to approve the draft regulations it had helped to prepare. And the tripartite working party stopped meeting. The provisions of the old Ontario Mining Act were left as the part of the Canada Labour Code that provided specifically for the health and safety of uranium miners. Thus, for a short period of time, Ontario uranium miners were in the anomalous position of having the provisions of the old Ontario Act apply to them while all other Ontario miners received the protection of the new, more comprehensive provincial health and safety legislation.

In their appearances before the Select Committee, the Steelworkers maintained and reiterated their current position that jurisdiction should lie with the province rather than the federal government. Ironically, it was the desire of the Steelworkers to benefit from the perceived advantages of federal legislation that played a vital role in the flow of events that culminated in Labour Canada fully occupying the field of conventional health and safety for uranium miners. Several factors are responsible for this apparent reversal of the position championed by the Steelworkers less than two years earlier. In October 1979, Ontario proclaimed its new Occupational Health and Safety Act and regulations. The Steelworkers had determined that the protection offered by Ontario laws were generally superior to those offered by the draft federal regulations prepared by the tripartite working group. In particular, the union considered the "right to refuse" clause, and the safety committee concept found in the new Ontario Act central to the broadened worker protection it sought for its members. And, as it made clear to the Committee, the union feels that the only position it will not and cannot change is its search for the best protection possible for its members.

In May, 1980, with work by the tripartite group clearly over, the federal government, in an apparent attempt at a workable compromise between its intention to fully occupy the field with federal legislation and pressures to offer the protection inherent in Ontario's new legislation, decided to adopt the new Ontario Occupational Health and Safety Act and regulations as federal law applying to Ontario uranium miners. Today, the Occupational Health and Safety Act and regulations apply to Ontario uranium mines except where the provisions of the adopted regulations conflict with the provisions of the Canada Labour Code.

THE PROBLEMS OF SPLIT JURISDICTION

The current jurisdictional arrangements thus include AECB, Labour Canada and the Ontario Ministry of Labour. Detailed regulations applied by Ontario inspectors acting as agents for Labour Canada are those that apply to all Ontario mines. On the surface, the situation appears satisfactory. There are, however, three different kinds of problems that make the arrangement unsatisfactory. There are conflicts between the Canada Labour Code and the Ontario Act and regulations; there are difficulties with administrative arrangements; and there is a specific legal matter that may cause the current arrangement to be legally invalid.

1. Conflicts with the Canada Labour Code

Should conflicts arise between the provisions of the Canada Labour Code and the adopted Ontario regulations, the provisions of the Canada Labour Code apply. This is because, as a general rule of law, regulations passed must be within the powers delegated by the statute under which the regulations are passed and if there is any inconsistency between the regulations and the statute, the statute must prevail. In this case, the Canada Labour Code is the dominating statute, while the Ontario Act is included as a regulation applicable only to Ontario uranium miners. The Committee has learned that there are three significant areas where such conflicts do exist:

- The right to refuse work – Under the Canada Labour Code, this right exists only where there is "imminent danger". Under Ontario's Occupational Health and Safety Act, this right exists where there is reason to believe that the work is "likely to endanger". Appeals from a safety officer adjudication under the "imminent danger" provisions are made to the Canada Labour Relations Board rather than the Ontario appeal authorities;

- Health and Safety Committees – Under the Canada Labour Code, the establishment of these committees is at the discretion of the federal Minister of Labour. Under the Occupational Health and Safety Act, the establishment of such committees is mandatory; and

- Prosecutions – Since the Ontario Occupational Health and Safety Act and regulations have been adopted by reference under the provisions of the Canada Labour Code as the applicable federal law regulating Ontario's uranium mines, prosecutions must be undertaken by the federal justice department under the authority of the federal Act.

These conflicts would not cause any difficulties if the parties involved agreed that the Canada Labour Code provisions were superior. Unfortunately, this is not the case. The United Steelworkers consider that these conflicts are at best confusing for their members and at worst detrimental to their health and safety.

2. Difficulties in Administration

In addition to the conflicts between federal and provincial statutes, the Committee identified two other major problem areas that it feels may have an even more significant adverse impact on the health and safety of the province's uranium miners:

- Lack of policy focus - As long as the ultimate jurisdiction is in doubt, Labour Canada will remain reluctant to fully occupy the field with its own staff and resources. Policy issues will be lost between the blurred boundaries of responsibility of the Atomic Energy Control Board, Labour Canada, and the Ministry of Labour; and

- Lack of administrative efficiency - Existing arrangements have led to examples of administrative confusion, general allegations of administrative inefficiencies and suggestions of unnecessary delays and complexities in enforcement.

Witnesses on behalf of the federal government argued that the importance of the areas of conflict and other perceived difficulties have been greatly exaggerated. Generally, federal officials argued that the current situation, while not ideal, was a reasonable compromise. Ultimately the jurisdictional difficulties would be clarified in the current constitutional debate. While the United Steelworkers placed great importance upon the differences between the federal "imminent danger" and provincial "likely to endanger" clauses, it was the position of Labour Canada that the differences are, in reality, of no consequence. The "likely to endanger" phrase does appear to be more permissive than the "imminent danger" phrase and workers do seem to like it better. Federal officials believe, however, that the phrases will be interpreted in such a way as to render meaningless the differences in wording. To date, neither the workers' position nor that of the federal officials can be proved and one can only speculate on the outcome of various board decisions.

In enforcement, Labour Canada witnesses pointed out that while there had been allusions to difficulties in prosecutions under the federal Act, few prosecutions had ever been undertaken by the provincial government under the old provincial Act. The Committee discovered, however, that there had, in fact, been at least twenty-six prosecutions over the last six years. In addition, the Committee saw signs of bureaucratic confusion in a current prosecution under the federal Act that is significant enough to have caused frustrating delay. These difficulties and frustrations are illustrative of the unnecessary complexities involved when three agencies in two levels of government attempt to administer what is essentially one area of concern.

In spite of the conviction of federal witnesses, the Committee believes that the current arrangement is sufficiently serious to cause grave and unnecessary difficulties in administration, enforcement, future policy formulation and the ongoing relationship between the various involved parties.

3. Problems of Legal Validity

One additional problem area identified by the Committee may mean that the adoption by reference of the Ontario Occupational Health and Safety Act and regulations by the federal government has no legal effect in Ontario. Simply, the adoption of the provincial act and regulations by the federal government may not have been done correctly. If this is so, Ontario uranium miners would be entirely without the legal protection of any Act or regulations other than the general provisions of Part IV of the Canada Labour Code, which, alone, are so

inadequate that Labour Canada adopted Part IX of the Ontario Mining Act in August, 1979, as an interim measure to ensure that there was some minimum level of protection for uranium miners. The reality of the situation is that, if the Committee is correct about the improper adoption of the provincial act, both the government and miners may be in the ludicrous and unacceptable position of having to rely upon the "goodwill" of the companies for any enforcement to be possible.

The problem is that the adoption by reference of the Ontario Act may not comply with the federal Statutory Instruments Act. This Act is intended to ensure that federal regulations are available to the public, are available in both official languages, and are examined by a Committee of Parliament. To achieve these objectives, the Act requires that copies of regulations, in both English and French, be sent to the Clerk of the Privy Council and registered. Following their registration, the regulations, with limited exceptions, must be published in the Canada Gazette, again in both official languages. The importance of the registration requirement is underscored by s. 9 (1) of the Act, which provides that regulations do not, as a rule, come into force until they are registered. A regulation which has not been registered pursuant to the Act is therefore not in force and has no legal effect.

If the Ontario Occupational Health and Safety Act and regulations have become, because of their adoption by reference, a federal regulation within the meaning of the Statutory Instruments Act, they have not come into force and have no legal effect in uranium mines in Ontario. When they were adopted by reference as federal law, English and French copies of the Act and regulations were neither sent to the Clerk of the Privy Council nor registered as prescribed by the Statutory Instruments Act. They have never been published in both official languages in the Canada Gazette. The federal government sent, registered and published only copies of the regulation under the Canada Labour Code which adopted the Ontario Act and regulations, but not the Act and regulations themselves.

Whether the Act and regulations are in force in Ontario uranium mines depends therefore on whether they themselves now constitute a federal "regulation", as that term is defined in the Statutory Instruments Act. Under s.2 (1) (b) of the Act, the definition of "regulation" is as follows:

> "2. (1) In this Act,
>
> . . . .
>
> (b) "regulation" means a statutory instrument
> (i) made in the exercise of a legislative power conferred by or under an Act of Parliament, or
>
> (ii) for the contravention of which a penalty, fine or imprisonment is prescribed by or under an Act of Parliament,
>
> and includes a rule, order or regulation governing the practice or procedure in any proceedings before a judicial or quasi-judicial body established by or under an Act of Parliament, and any instrument described as a regulation in any other Act of Parliament."

According to this definition, a document must first be a "statutory instrument" in order to constitute a "regulation". The Act sets out the following definition of that term in s.2 (1) (d):

> "(d) "statutory instrument" means any rule, order, regulation, ordinance, direction, form, tariff of costs or fees, letters patent, commission, warrant, proclamation, by-law, resolution or other instrument issued, made or established

(i) in the execution of a power conferred by or under an Act of Parliament, by or under which such instrument is expressly authorized to be issued, made or established otherwise than by the conferring on any person or body of powers or functions in relation to a matter to which such instrument relates, or

(ii) by or under the authority of the Governor in Council, otherwise than in the execution of a power conferred by or under an Act of Parliament,

but does not include

(iii) any such instrument issued, made, or established by a corporation incorporated by or under an Act of Parliament unless

(A) the instrument is a regulation and the corporation by which it is made is one that is ultimately accountable, through a Minister to Parliament for the conduct of its affairs, or

(B) the instrument is one for the contravention of which a penalty, fine or imprisonment is prescribed by or under an Act of Parliament,

(iv) any such instrument issued, made or established by a judicial or quasi-judicial body, unless the instrument is a rule, order or regulation governing the practice or procedure in proceedings before a judicial body established by or under an Act of Parliament,

(v) any such instrument in respect of which, or in respect of the production or other disclosure of which, any privilege exists by law or whose contents are limited to advice or information intended only for use or assistance in the making of a decision or the determination of policy, or in the ascertainment of any matter necessarily incidental thereto, or

(vi) an ordinance of the Yukon Territory or the Northwest Territories or any instrument issued, made or established thereunder.

It is apparent that this definition is both complex and difficult to apply. The Committee agrees with the observation of the Standing Joint Committee of the Senate and House of Commons on Regulations and other Statutory Instruments that the definition "is so hedged about with exceptions at one and the same time explicit in nature but obscure in meaning and with qualifications direct and indirect and so flawed with a triple negative that it is useless". Generally speaking, however, it can be said that a document is a "statutory instrument" if it is a rule, regulation or other instrument issued, made or established in the exercise of a power conferred by or under an Act of Parliament.

The Canada Labour Code authorizes the federal government to regulate health and safety and to adopt safety codes, and it was under that Act that the Ontario Act and regulations were adopted as federal law. The legal effect of the adoption was to make or establish Ontario law as the federal "code" or "rules" or "regulations" applicable to health and safety in uranium mines in Ontario. In fact, the Ontario law can only apply if it is made or established as federal law, since jurisdiction to regulate health and safety in uranium mines is very likely

exclusively federal. It follows that the Ontario Act and regulations now constitute a "code" or "rules" or "regulations" established, for federal purposes, in the exercise of a power conferred under an Act of Parliament. They do, therefore, very likely constitute a "statutory instrument" within the meaning of the Statutory Instruments Act.

According to the definition of "regulation" set out above, a statutory instrument is a "regulation" if it satisfies one of two additional conditions: if it was made in the exercise of a legislative power conferred by or under an Act of Parliament; or if a federal statute provides a penalty for breaching it. The adopted Ontario laws satisfy both conditions. In the first place, it is clear that they were established as federal law in the exercise of a legislative power conferred by an Act of Parliament. A legislative power is a power to make general rules, and the Canada Labour Code, under which the Ontario Act and regulations were adopted as federal law, expressly confers the power to make or adopt general rules respecting health and safety. Secondly, s.97(1) (a) of the Canada Labour Code makes it an offence to violate any provision of Part IV of the Act (which deals with health and safety) or of any regulation made under it. Since the regulation adopting the Ontario Act and regulations requires that they be complied with, any breach of the Ontario law is punishable under s.97 (1) (a). Both the Ontario and federal governments have recognized this fact and have accepted that health and safety violations in uranium mines must be prosecuted by the Federal Department of Justice under the Canada Labour Code.

The Ontario Act and regulations, therefore, constitute a federal "regulation" because of their adoption by reference. And, as a consequence of the possible failure of the federal government to observe the requirements of the Statutory Instruments Act, they may now have no legal effect on uranium mines in Ontario.

At the very least, the Committee considers that both the federal and provincial governments have been insensitive to the very high proportion of French speaking miners in the industry. The Province of Ontario has amended Section 26 of the Ontario Evidence Act to allow copies of Ontario statutes that are translated into the French language to be admitted in evidence. It has translated over thirty statutes, including the Occupational Health and Safety Act, but has not yet translated the regulations under the Act into French. As well, it has made available only an English language pocket handbook containing the Act and regulations for the information of workers and the general public even though the regulations themselves form a integral part of the laws governing occupational health and safety.

The federal government has attempted, at the very least, to violate the spirit of its own Official Languages Act and Statutory Instruments Act. The Official Languages Act requires all instruments in writing directed to, or intended for, the notice of the public issued or made by authority of parliament or of the government of Canada to be promulgated in both official languages. The Act makes it clear that its intention is to ensure that the English and French languages possess and enjoy equality of status and equal rights and privileges as to their use in all the institutions of the parliament and Government of Canada. The Statutory Instrument Act is intended to provide for the examination, publication and scrutiny of regulations and other statutory instruments. The provisions of this Act appear, on their face, to ensure that all regulations and other statutory instruments will be available for public scrutiny in both official languages. A logical conclusion is that this is only meaningful if it is the actual laws themselves that are available for public scrutiny rather than a document that simply formalized their adoption. In any event, it is clear that the status of the French language, in this instance, has been denigrated, even if the federal government has somehow met the technical requirements of the Statutory Instruments Act.

The Committee considers, that there is a very real possibility that the Government of Canada has not met the technical requirements of the Statutory Instruments Act and that as a result Ontario's uranium mine workers are operating wholly without the legal protection they

are entitled to and have been assured they have. The Committee believes that the federal authorities must test this possibility. In an industry fraught with many existing dangers, uranium miners are entitled to the greatest degree of administrative certainty possible. The Government of Canada must be in a position to assure the workers absolutely that the laws governing their health and safety are valid. It is totally inappropriate for federal authorities to simply allow the issue to be determined by a court if it is ever put forward as a defence to a prosecution under the Canada Labour Code or to rely upon the "goodwill" of the mining companies. Under the circumstances, the Committee considers that it would be highly inappropriate for the federal authorities to avoid fully testing the legal validity of the regulations.

> RECOMMENDATION 1: THE GOVERNMENT OF CANADA IMMEDIATELY TAKE ALL STEPS NECESSARY TO TEST THE VALIDITY OF THE FEDERAL ADOPTION OF THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS AND IN PARTICULAR TO BRING THE ISSUE BEFORE THE APPROPRIATE COURT.

The Committee, is aware, however, of the possibility that the Government of Canada for reasons other than a concern for the health and welfare of uranium miners may choose to ignore this recommendation. The Committee believes strongly that the matter cannot be ignored simply because the federal government wishes not to deal with it.

> RECOMMENDATION 2: IF THE GOVERNMENT OF CANADA FAILS TO TEST THE FEDERAL ADOPTION OF THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT THE ATTORNEY GENERAL OF ONTARIO SHOULD, WITHIN THREE MONTHS OF THE TABLING OF THIS REPORT, IMMEDIATELY TAKE ALL STEPS NECESSARY TO TEST THE VALIDITY OF THE FEDERAL ADOPTION OF THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS AND IN PARTICULAR TO BRING THE ISSUE BEFORE THE APPROPRIATE COURT.

JURISDICTIONAL CONFUSION ON THE ENVIRONMENTAL SIDE

The Committee has also heard evidence of jurisdictional confusion relating to environmental matters. As discussed earlier in this chapter, certain nuclear works and undertakings have been declared works for the general good and advantage of Canada, and sole jurisdiction over all such works and undertakings falls to the federal government. Thus, the operation of any applicable provincial environmental legislation may be suspended, preventing provincial and municipal authorities from applying their own environmental control legislation to nuclear facilities. While exclusive federal jurisdiction may be appropriate under some circumstances, the Committee is concerned over its adverse impact in this particular area. The Committee has discovered that the federal government has generally failed to enact or enforce suitable environmental protection legislation. In fact, the environmental protection service of Environment Canada, relying upon provincial agencies, considers its main function to be the setting of minimum national standards. The environmental consequences of this approach to nuclear facilities may be extremely grave.

The Provincial Deputy Minister of the Environment has described the provincial role in establishing and enforcing environmental laws in this area as "constrained and unclear". The Ministry currently inspects uranium mine and mill facilities to monitor effluents and assess the adequacy of their design, engineering and operations. In carrying out these normal protective

functions, Ministry officials apply both specific provincial standards and the general approach and philosophy embodied in provincial statutes. However, the federal presence in nuclear matters may make the provincial activities entirely gratuitous. The province may, in fact, have no authority whatsoever to establish and enforce environmental controls affecting the uranium mines and mills. The view of the Deputy Minister can be clearly understood and must be viewed with alarm.

Currently, prosecutions must be for operating other than in accordance with the licence issued by the AECB, rather than for directly violating a licence condition. The complexity and uncertainty inherent in the situation is underlined in a 1978 letter to the Atomic Energy Control Board from the provincial Minister of the Environment, which says in part:

> "It appears particularly cumbersome and involved if what is wanted is prosecution, for instance, for the violation of a provincial control order; and what is possible, given the constitutional situation, is a prosecution for operation otherwise than in accordance with a licence which contains a condition which incorporates a provincial law which authorizes a control order which has been issued and subsequently violated".

The actual working arrangements on environmental matters appear to be handled better than those concerning health and safety. AECB staff, in fact, confer frequently with environment officials to determine the adequacy of effluent controls in nuclear facilities. The existing jurisdictional uncertainties are, however, intolerable in light of the clear cut need for protection of the environment and the "minimum standard" role Environment Canada has defined for itself. It is essential that the environmentally sensitive uranium mines at Elliot Lake clearly be legally subject to more than minimum environmental standards.

CONSOLIDATING THE FEDERAL RESPONSIBILITY

The Committee believes that jurisdiction in both the areas of conventional health and safety and environmental controls should ultimately rest exclusively with the provinces in relation to nuclear facilities. Constitutional reform will, of course, take some time to effect. The Committee believes that the best interim solution to the jurisdictional difficulties involves the consolidation of all federal responsibilities in one agency. That agency can only be the Atomic Energy Control Board since the Atomic Energy Control Act already gives that agency primary responsibility for the control and supervision of all works associated with the production of atomic energy.

If AECB were to accept full federal responsibility, the provinces would then have to deal with only one national regulatory authority for all activities in the nuclear industry and the federal government would have justification for equipping AECB with the staff to handle labour safety – an area now administered by Labour Canada which is reluctant to commit its own staff and resources. Consolidating in the AECB would:

- eliminate one whole level of bureaucracy (the officials in the Departments of Labour and the Environment);
- eliminate areas of conflict between Part IV of theCanada Labour Code and Ontario's Occupational Health and Safety Act;
- bind radiation and non-radiation standards. (For example, there would be only one radium standard whether the limiting condition is toxicity or radioactivity); and

— eliminate current uncertainty surrounding enforcement and ensure the applicability of provincial laws to the greatest degree possible.

RECOMMENDATION 3: AECB ACT AND REGULATIONS SHOULD BE AMENDED TO MAKE IT CLEAR THAT LICENCE CONDITIONS MAY BE IMPOSED IN THE INTEREST OF ENVIRONMENTAL PROTECTION AND HEALTH AND SAFETY, THAT LICENCE CONDITIONS MAY INCORPORATE PROVINCIAL LAWS AND TO GIVE THE AECB THE NECESSARY POWERS TO IMPOSE PENALTIES AND CARRY ON PROSECUTIONS IN SPECIFIC AREAS.

RECOMMENDATION 4: THE AECB SHOULD OCCUPY THE FIELD OF CONVENTIONAL HEALTH AND SAFETY BY INCORPORATING ONTARIO'S OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS.

RECOMMENDATION 5: THE AECB SHOULD OCCUPY THE ENVIRONMENTAL FIELD FOR NUCLEAR FACILITIES BY INCORPORATING PROVINCIAL REQUIREMENTS UNDER APPLICABLE ENVIRONMENTAL STATUTES AND SPECIFIC TECHNICAL REQUIREMENTS RECOMMENDED BY THE PROVINCIAL MINISTRY OF THE ENVIRONMENT AND MAKING COMPLIANCE A LICENCE CONDITION.

CHAPTER 2

HEALTH AND SAFETY IN ONTARIO URANIUM MINES

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About 90% of Ontario uranium is produced near Elliot Lake at mines operated by Rio Algom Mines Limited and Denison Mines Limited. Both companies have a long history at Elliot Lake, tracing their own corporate existence back to the earliest discoveries in the area. The mining process is typical of relatively deep hard-rock mining in the Canadian Shield. The operations are very large and are expanding: by 1985 each company will be mining about 22,000 tons of ore per day using highly mechanized methods of drilling and moving ore.

Neither the particular conditions under which the mines operate nor the efforts of all parties to improve working conditions have been directly affected by the tangled and uncertain jurisdictional issues. Provincial inspectors and safety officials carry out regular inspections and issue specific requirements despite their questionable authority. In almost all cases requirements are met without recourse to the legal process. The mining companies, for their part, have agreed to proceed as if the Ontario Health and Safety Act and its accompanying regulations for mining were fully in effect. In fact, the Committee found that the United Steelworkers, while clearly active and vigilant in assuring worker safety did not present to the Committee a list of unsatisfied safety concerns.

The Committee did find substantive problems in worker health and safety, but their roots did not lie in the uncertain legislative framework. Rather, these problems were rooted in the nature of underground mining, of mining at Elliot Lake, and of mining uranium. Underground mining, despite continuing if not steady improvements, remains a hazardous occupation. This year an unusually high fatality rate in Ontario led to the creation of a Federal-Provincial Commission to probe further into the hazards of underground mining. Mining at Elliot Lake also carries with it the additional hazard of silicosis from the relatively high silica content of the ore. Typically the ore is about 65% silica, as compared to less than 10% in other Ontario mines. Finally, uranium mining poses the hazard of working in a radioactive environment. All uranium bearing ore contains the natural decay products of uranium, the most hazardous in a mining operation being the "daughter products" of radon.

This chapter contains the findings and recommendations of the Committee on three topics: taking a new approach to conventional health and safety; lowering silica exposures; and strengthening current radiation protection practices.

A NEW APPROACH TO MINE SAFETY

Since mining began at Elliot Lake there have been 77 fatalities. Most occurred during the early operations of several new mines. Until the first half of 1980, fatal accidents had become relatively rare events. Injuries however, are not rare; they occur fairly frequently and, as shown in Exhibit 2-I, do not show any sign of general decline. An injury rate of 50 per million man hours – typical for Ontario mining – means that about one worker in ten will have a lost time injury every year. Since most injuries occur underground, the chances of an underground miner suffering a lost time injury are, of course, significantly higher.

Exhibit 2-I also indicates that uranium mines have, generally, a better safety record than the average for all Ontario mines. This is a somewhat misleading comparison. In fact, the Elliot Lake uranium mines tend to be second only to the nickel mines in annual lost-time injury rates.

The Committee was concerned with the continuing hazards of underground mining. It was also perplexed, as clearly the main participants in any safety program work assiduously at maintaining high industry standards. The mines are inspected almost daily by provincial mines inspectors. The companies maintain Safety Departments to work at ways to improve safety. Visitors to the facility find warnings and reminders prominently posted. The union is constantly vigilant for potential danger. Health and Safety Committees, with management and union representatives, function in each of Ontario's uranium mines.

Were attention to safety sufficient to improve it, then the combined efforts of the companies, the union, both provincial and federal officials and industry associations would have been successful. The Committee, which did not claim expertise in mine safety but which approached the problem with a fresh perspective and experience with other industries, concluded that the number of hazards associated with mining far exceeds the level of danger considered tolerable in other industries.

By its very nature, mining cannot be as tightly controlled as most other industries, and perhaps, underground mining will always be one of the riskier occupations. Nevertheless, the Committee found that acceptance of this inevitability has left the underground mining environment with many hazards that could be corrected. From its own tour of mines, the Committee noticed many examples of unnecessary hazard, including:

- inadequate closure of openings, especially in working areas where ore passes are secured by minimal safety barriers;
- inadequate lighting in many working areas, but especially along passageways where heavily laden ore trains regularly move; and
- inadequate clearances in areas where men, often carrying heavy loads and equipment, must move awkwardly to get by an obstruction.

As these examples indicate, the Committee found that there are far too many opportunities left for unsafe acts; there are far too many opportunities for a tired, distracted worker or for one pushing for more production to make a mistake and pay for it with his life. There is, in Ontario, direct experience to demonstrate that mining can be safer. Exhibit 2-II lists nine mines with injury rates between 5 and 15 per million man hours, a much superior record to that of the Elliot Lake uranium mine (typically 25 to 30) or Ontario mines in general (typically 45 to 60). The Committee realizes that, because the mines listed are not identical to those at Elliot Lake, simple comparisons can be misleading. Nevertheless, the list does indicate, that a number of different mines in a variety of different circumstances have succeeded in achieving superior safety performance. The Committee urges the entire mining community to broaden its perspectives and to reach for a higher level of safety by questioning traditional practices and by looking for expertise from outside the industry.

Questioning Traditional Practices

During the Committee's hearings, two quite different changes to current mining practice were extensively discussed. One involved the addition of new skills in mine planning; the other, alternative compensation arrangements. The cautious reaction of industry spokesmen to each suggestion is indicative of an industry that clings to its traditional practices and accepts new departures only reluctantly. But, improved safety may depend on taking new approaches.

One potential change to mining practice involves the new set of skills available in the area of rock mechanics. Every year Canadian schools graduate a few ground control engineers with advanced degrees in rock mechanics. These highly trained individuals can apply new tools and

techniques to mine planning, such as computerized models of rock structures, to improve understanding of stresses on rock formations and thereby provide more assurance that miners are not exposed to unnecessary risks of rock falls or rock bursts. The concerns of an engineer with advanced training in rock mechanics are the same as those of a mine planning engineer; only the approach to the solution is different.

The Committee heard considerable discussion on the value of advanced training in rock mechanics. Some felt that an experienced mine engineer was as competent as a more advanced graduate. The Committee nevertheless concluded that the higher level graduate with training in new tools and technologies must enhance sound mine planning. Mining operations as large as those of Rio Algom and Denison at Elliot Lake would obviously benefit from the availability of these new tools and techniques.

The Mine Safety Branch of the Ontario Ministry of Labour has already recognized the value of the advanced training. A trained rock mechanics engineer is on staff; furthermore, under the Mine Safety Regulations, the Branch can require a mine to add the skills of such staff if circumstances dictate. Thus the Ministry has both the expertise and the power to ensure the new skills are added; it should not be deterred by the industry's reluctance to change.

> RECOMMENDATION 6: THE MINING INDUSTRY SHOULD ACTIVELY ACCEPT THE VALUE OF NEW SKILLS AND TECHNOLOGIES AVAILABLE FOR SOUND MINE PLANNING. TO FURTHER THIS ACCEPTANCE, THE MINISTRY OF LABOUR SHOULD ENSURE THAT COMPANIES HIRE PEOPLE WITH THE MOST ADVANCED SKILLS. SPECIFICALLY, BOTH DENISON MINES LIMITED AND RIO ALGOM MINES LIMITED SHOULD EACH HAVE A FULLY QUALIFIED ROCK MECHANIC ON STAFF.

A second area of considerable debate, similarly encountering the industry's reluctance to change, concerned the bonus system for compensating miners. In most Ontario mines, miners are paid a base rate of $9/hour plus a potentially very sizable bonus based on daily production. High bonus workers can earn as much as $35,000 per year, in comparison to $20,000 by their less productive co-workers.

The bonus system has a long history in the mining industry; it originated with the contract miner, who actually "sold" his output to the mine owners. It is clearly a popular compensation system with the workers, not only those who are able to earn a good bonus, but also those who like to feel that the potential is available. The bonus system is also attractive to the companies, as a means of maintaining employee motivation and productivity in an environment where close supervision is impossible.

The problem with the bonus system is that it may induce workers to cut corners in order to increase production and earn bonus dollars. This temptation is especially hazardous in underground mining where, as has already been noted, there are already too many opportunities for the commitment of unsafe acts. Mining companies counter this argument by pointing out that high bonus workers have the best safety records. While this may be true, there is also some indication that low bonus workers have the worst safety record. The argument can be made that a skillful, experienced miner will be a safe, productive worker – bonus or no bonus – while a less skilled, inexperienced miner will be less productive, less aware of the hazards and expose himself to increased risk to earn a higher bonus.

The Committee believes that it is time for the mining industry – both companies and miners – to break with tradition and to take a critical look at the bonus system. A new approach to remuneration could counter the current situation where high productivity is off-set by shortages of skilled miners and by high turnover among young miners. A safer industry would

undoubtedly attract and hold more workers and be more productive. Some alternatives that should be carefully evaluated are:

- changing the bonus formula to give more emphasis to safety practices such as thorough scaling of loose rock;

- eliminating the bonus altogether and treating the miners as professionals, in both compensation and supervision;

- relating the bonus to production over a relatively long period of time (say an entire month or quarter) to encourage steady work patterns

- developing bonus arrangements that compensate a working team of miners for an accident-free record to increase self-policing

RECOMMENDATION 7: THE MINISTRY OF LABOUR SHOULD CO-OPERATE WITH THE MINING INDUSTRY TO DEVELOP AND TEST ALTERNATIVES TO THE CURRENT BONUS SYSTEM, AS A STEP TOWARD INCREASING THE WORKER'S APPROACH TO SAFETY.

Seeking Help
Outside the Industry

Committee hearings indicated that mining is safer today than it was even a few years ago; improvements have been made. It is also evident from Exhibit 2-I that injury rates seem to be levelling off. Rethinking traditional practices can help make further improvements but the industry must, as well, be prepared to look to other industries for new approaches. The expertise of outsiders may help to identify further areas where positive changes can be made.

In its earlier assessment of the safety of nuclear reactors, the Committee was impressed with the effectiveness of Ontario Hydro's practices for ensuring the safety of its workers. Two general principles emerged that are of general applicability to the mining industry: setting high objectives and carefully analyzing all unusual events:

- Ontario Hydro has accepted that its nuclear workers may be at some risk from occupational exposures to radiation. Therefore, they have set an objective of achieving an extremely high level of worker safety against conventional hazards. The total occupational risk accepted by workers in nuclear plants is thereby kept very low. High objectives often lead to superior results. Systems, designs and procedures are all tuned to achieving superior safety results.

- Accidents may be nothing more than unusual events that have bad results. If all unusual events are analyzed and the conditions that created them are eliminated, then the bad results is also eliminated. Ontario Hydro carefully analyzes all accidents and other potentially hazardous events in an effort to seek out causes that may have been overlooked, to identify contributing factors that may not be immediately obvious and to identify potential accidents before they happen.

The Committee would like to see the uranium mining industry commit itself to a comprehensive program to reduce the risks to underground miners. In response to the fatal accidents earlier in the year, Rio Algom has already committed itself to a complete reassessment of its safety practices through internal reviews and an independent audit of its safety systems.

The Committee endorses this initiative and encourages Rio Algom to seek industrial safety expertise from outside the mining industry in the conduct of the audit.

RECOMMENDATION 8: THE MINISTRY OF LABOUR SHOULD WORK WITH EACH MINING COMPANY TO DEVELOP A COMMITMENT TO A SPECIFIC TARGET OF SUPERIOR SAFETY PERFORMANCE. THE MINING INDUSTRY IN GENERAL SHOULD LOOK TO OTHER HEAVY INDUSTRIES WITH SUPERIOR SAFETY PERFORMANCE TO FIND NEW AND MORE COMPREHENSIVE APPROACHES. THE URANIUM MINING COMPANIES SPECIFICALLY SHOULD COMMIT THEMSELVES TO ACHIEVING A HIGHER LEVEL OF SAFETY THAN OTHER ONTARIO MINES.

IMPROVING AIR QUALITY

Industry spokesmen always caution against overgeneralizing about mining because of the unique characteristics of each operation. The unique characteristics of the Elliot Lake ore body include a very high silica content - similar to Ontario gold mines - and a very large ore seam - similar to a coal mine. The first characteristic contributes to increased risk of silicosis; the second to a more mechanized operation that in turn contributes to increased levels of diesel exhaust in the mine atmosphere. Both need greater control.

The existence of diesel fumes is apparent to anyone visiting the mine. Although both Rio Algom and Denison generally meet the standards set by regulation individual miners complained to Committee members of feelings of weakness and nausea at the end of a day's work. There are limits to the horsepower that can operate in a specific area and there is a far higher movement of air through the trackless mechanized mines of Elliot Lake than other kinds of mines. Improvements will not be easy and will probably come from workers and management paying more attention to the maintenance and tuning of the equipment. The Committee urges both parties to do all they can to minimize diesel pollution.

If diesel fumes are an irritant and a nuisance, silica exposure is a definite hazard. Inhalation of free silica can, over time and after a latency period of up to twenty years, lead to an impairment in breathing capacity through a lung disease called silicosis. Silicosis and its related lung complications has been recognized by the Workmen's Compensation Board since 1926. About half of all cases recognized by the Board are charged to the mining industry and about one quarter of these are assessed to the uranium mines.

The mining industry, through the Mines Accident Prevention Association, has made concerted efforts to control dust conditions. In its mine tours the Committee noted that mining equipment and procedures are designed to keep broken surfaces and muck piles wet. The Ham Commission reported that dust levels in nickel, gold and uranium mines were 40 to 50% lower in 1975 than they had been in 1960. In uranium mines, where free silica levels are high, the industry guideline for dust levels is tighter than it is for other types of mining. For example, in nickel mines, where the dust is about 10% quartz, the suggested permissible dust concentration is 500 particles per cubic centimetre. In uranium mines where the dust is 60 to 70% quartz, the concentration guideline is set at only 200 particles per cubic centimetre. While there is every indication that the companies at Elliot Lake have worked hard at reducing dust, and indeed have achieved substantial reductions, there are still areas of the mine where, at certain times, high dust levels pertain.

Over four years ago, Dr. Ham's Royal Commission on the Health and Safety of Workers in Mines urged the establishment of a regulatory standard for personal lifetime exposure and maximum permissible concentrations of free silica in the mine and plant atmosphere. The Ministry of Labour has developed proposed silica standards but has not yet taken all the steps

necessary to bring them into practice. The Atomic Energy Control Board indicated that it is working on annual exposure limits, but, again, these are not yet completed. The Committee agrees with the workers that there has been far too much delay. Silica is a known occupational health hazard; its control must be part of the regulatory framework.

RECOMMENDATION 9: THE MINISTRY OF LABOUR SHOULD TAKE ALL STEPS NECESSARY TO ENACT A REGULATORY STANDARD FOR SILICA. THE AECB SHOULD ENDEAVOUR TO ESTABLISH ANNUAL PERSONAL EXPOSURE LIMITS AND THE ACCOMPANYING CODES OF PRACTICE AS SOON AS POSSIBLE.

STRENGTHENING RADIATION PROTECTION

The third set of hazards encountered by uranium miners comes from the ionizing radiation present to some extent in all parts of the nuclear cycle. In uranium mining the principal risk is from the radioactive gas radon which is released from broken rock, rock faces and mine water. The radon gas decays into elements called "radon daughters" that have a propensity for sticking to the surface of the lung and trachia on inhalation. These "radon daughters" emit alpha particles, a form of radiation that is particularly hazardous when it is inhaled or ingested into the body. A secondary and less significant risk comes from exposures to beta and gamma radiation released from the ore body being worked. Beta and gamma rays contribute primarily to external radiation of the body; alpha to internal irradiation. Both internal and external radiation is now subject to regulatory control by the Atomic Energy Control Board.

The Atomic Energy Control Board was created by an act of the federal parliament in 1946. The AECB was empowered to make regulations respecting all aspects of the atomic industry, including mining and prospecting for uranium or thorium. From its inception into the sixties, the AECB interpreted its interests to encompass the security of uranium and its reserves (to this time the principal use of uranium was as material for nuclear weapons).

It was understood and agreed with the provinces that provincial authorities would take responsibility for health and safety. The AECB included in each of its licences a condition requiring compliance with provincial laws respecting mine safety. In 1960, the Board undertook more directly the regulatory aspects of its role; it incorporated into its regulations radiation protection provisions based on the advice of the Dominion Council of Health – a body made up of federal and provincial deputy ministers of health – and on the recommendations of the International Commission on Radiological Protection. The 1960 provisions covered external radiation but did not include specific provisions for "radon daughters". That problem was left to the provincial Departments of Mines.

In the late fifties, the Ontario Department of Mines adopted a target maximum permissible concentration of radon and its daughter products of one working level. (A working level is the internationally accepted method of measuring the concentration of "radon daughters". Exposure to a concentration of one working level for a period of 170 hours or a normal working month would equal a dose of one working level month or WLM).

Industry representatives and occupational health authorities continued to study the health records of miners exposed to radiation in mines. Through this work and through work conducted in other countries it was determined that a permissible concentration of one working level – equivalent to an average permissible dose of 12 working level months – was too high. In 1967 the Ontario Department of Mines issued an order to reduce maximum permissible exposures from 12 working level months to 4 working level months. This new order also contained a requirement for the maintenance of personal radiation exposure records. To this point the AECB was still acting primarily in an advisory role.

In 1974 the AECB began to involve itself further in the protection of uranium miners. It established a mine safety advisory committee and responded to the activities and report of the Ham Commission. In 1976 the Board published interim limits for exposure to "radon daughters" as a basis for discussion with all interested parties. In 1978 the interim limits – the same 4 working level months established by the Ontario Department of Mines – were given permanent status.

Today the AECB is highly involved in the health, safety and environmental aspects of uranium mining. It has:

- taken responsibility for monitoring all the radiation protection standards and will shortly be issuing new guidelines on combined exposure to alpha, beta and gamma rays;
- developed a code of practice now included in licences for implementation of the principle of keeping exposures as low as reasonably achievable below the regulatory limit;
- standardized procedures for measuring radon daughter concentrations;
- organized and sponsored training and refresher courses for uranium mine inspectors; and
- initiated research and development activities on various aspects of its regulatory responsibilities.

Paralleling the evolution of the regulatory system, the industry and especially the companies at Elliot Lake, have made considerable improvement in radiation control practices. Ventilation – the principal tool in reducing the build-up of "radon daughter" products – has been substantially increased and has resulted in a significant reduction in worker exposure to alpha radiation. The companies have also taken the initiative in experimenting with various protective breathing systems. Today a helmet that provides a filtered air supply to the face – the Airstream helmet – is available to all miners and required for those working in areas of highest potential exposure. Further, companies initiated and now fund a program for providing workers with early warning signals of lung disease – the Sputum Cytology program. Finally, the companies have made some efforts to educate workers on the hazards of radioactivity; Denison in particular has developed a good explanatory booklet on radiation.

Despite the continued improvement in both the regulatory and working control of radiation exposures, the Committee found four areas where the current system could be improved: each is discussed in greater detail below.

Measuring Individual Exposures

Working level exposures are computed monthly for each worker in the mine and mill. The calculations are based on samples taken at least monthly at each work, main travelway and lunch area. The worker's time in each sample location is estimated from his work assignment report. Records are kept by the company, with various exposure reports sent monthly, quarterly and annually to the AECB.

Since radiation intensity can vary from day to day and from workplace to workplace, the Committee was concerned that the sample and computation system is not a reliable indicator of personal exposure. Furthermore, the system cannot reliably pick up variations in hazardous

accumulation of "radon daughters" caused either by specific mechanical deficiencies in the ventilation system and/or by poor working practices such as temporarily shutting off an auxiliary fan, or failing to close air lock doors. Finally, the system leaves itself open to a continuing suspicion that the results can be adjusted to suit the company's purposes. Because all the readings are averaged into the exposure calculations, critics claim that the company is able to avoid reporting high exposure levels. For example, if a sample indicated a high concentration of "radon daughters", mine management could attempt to fix the ventilation problem and keep taking samples until it is assured the problem is fixed.

The only solution to all these problems is to equip each worker with an instrument to measure personal exposure. The instrument – a personal dosimeter – is currently being developed in the United States and France. The AECB has followed developments and Canadian mining companies are now testing personal dosimeters in their own environments. To date, the AECB has not judged any available personal dosimeter more reliable than the current sampling and computation system. The Committee appreciates the need for AECB to take a cautious approach but was disturbed by how slowly the instruments are being developed and by how little work is actually being done in Canada, one of the world's leading uranium producers. The Committee would like to see a far greater effort to bring personal dosimeters into regular use.

RECOMMENDATION 10: BOTH THE URANIUM MINING COMPANIES AND THE AECB SHOULD COMMIT THEMSELVES TO A SUBSTANTIAL INCREASE IN TESTING AND DEVELOPMENT OF PERSONAL ALPHA DOSIMETERS WITH THEIR EARLY ADOPTION AS A HIGH PRIORITY.

Tightening Individual Exposure Standards

Even if an improved, reliable system for determining individual exposures were in place, there are two additional problems with current standards. The first is that exposures are aggregated over a calendar year; on January 1 each individual starts over again at zero annual exposure. In other parts of the nuclear industry, exposures are aggregated each month on a running twelve month basis. Thus January exposures are added to all exposures from the previous eleven months and individual protection is uniform throughout the year. The current practice was adopted by the uranium mining industry because it is believed that the overall risk from radon daughter exposure relates more to long term cumulative exposure than to the annual dose. Nevertheless, the Committee found that the formal annual limits, as well as informal monthly and quarterly limits, are used in work assignments to keep individual exposures lower than they might otherwise be. A running twelve month exposure standard would further support the informal industry practices that result in the lowering of individual doses and, therefore, the reduction of lifetime exposures.

RECOMMENDATION 11: THE AECB SHOULD SPECIFY THAT ITS REGULATORY LIMIT FOR ANNUAL PERSONAL EXPOSURE TO RADON AND ITS DAUGHTER PRODUCTS BE AGGREGATED ON A RUNNING TWELVE MONTH BASIS.

A second problem is that workers can be exposed to measurable radon concentrations both at home and at work because uranium mines are located in areas where uranium outcroppings are found in residential areas. In Elliot Lake, for example, remedial protective work is required in many homes to keep "radon daughter" concentrations below the .02 provincial limit for dwellings. It is possible, depending on certain, simple assumptions, for workers who live in one of the houses in which the radon concentration is near the .02 level to accumulate about one-half a working level month in each twelve month period. The

aggregation of home and work exposures would ensure all miners are afforded equal protection and could help sensitize residents of communities close to uranium mines to the need to keep their home protection equipment working.

RECOMMENDATION 12: THE AECB'S REGULATORY LIMIT OF 4 WORKING LEVEL MONTHS PER TWELVE MONTH PERIOD SHOULD INCLUDE EXPOSURES BOTH AT WORK AND AT HOME.

Improving Worker Training

Even with a better measurement system and a more consistent application of the standard, it will always be difficult to keep personal exposures as low as possible. One problem pointed out to the Committee concerned the use of respiratory equipment worn as filter masks or Airstream helmets. In the calculation of individual exposure, workers using such equipment are credited with only half the personal dose that could be attributed to a given concentration of radioactive elements. If respirators fit properly, have clean filters and are properly worn, the 50% credit probably understates the additional protection they provide. However respirators do not always fit properly, filters are not always clean and the masks may be removed or not worn tightly clamped against the face. In such circumstances, the respirator credit may be misleading and may hide higher personal exposures.

There are two potential approaches to this problem. The first, and undoubtedly the most effective, is to ensure that all areas of the mine are kept ventilated sufficiently to eliminate the need for respirators. Unfortunately this is not always possible; some areas of some mines will always have higher levels of radon activity. The second approach is to ensure that all miners are so aware of the radiation hazard that they will personally ensure that the respirator is effective and worn properly. Achievement of this level of awareness requires emphasis on the radiation hazard and radiation protection equipment from the earliest training program through later refresher courses. It also requires the continued re-inforcement that can be achieved by posting individual radiation exposures and work site concentration in visible locations throughout the mine, a practice already followed by Rio Algom.

RECOMMENDATION 13: THE AECB SHOULD REQUIRE ALL URANIUM MINING COMPANIES TO EDUCATE WORKERS REGARDING THE RISK OF RADIATION AND THE USE OF RADIATION PROTECTION EQUIPMENT AND SYSTEMS AND PERIODICALLY UPDATE THE WORKERS' INFORMATION. TO FURTHER THIS GOAL, THE AECB SHOULD APPROVE THE CONTENTS OF ALL TRAINING AND REFRESHER COURSES.

RECOMMENDATION 14: THE AECB SHOULD REQUIRE THAT URANIUM MINING COMPANIES POST UP-TO-DATE INDIVIDUAL RADIATION EXPOSURES AND WORK SITE CONCENTRATIONS IN A VISIBLE LOCATION.

Avoiding a Reduction of Current Protection Levels

During its hearings the Committee became aware that a new set of radiation protection standards is being developed. The new standards will have the very desirable effect of combining alpha, beta and gamma exposures. Currently, a nuclear industry worker could receive up to the 5 Rem limit in beta and gamma radiation in addition to the 4 WLM limit of alpha radiation. Miners' exposures for alpha radiation are carefully monitored; the low levels of

beta and gamma radiation however, are not routinely checked. Workers at nuclear power plants are treated in exactly the opposite way; beta and gamma radiation is carefully monitored and alpha is not. The current standards did not intend to permit this potential two-fold exposure.

To implement the new combined radiation approach, the AECB will, as of January, 1981, require all miners to wear a small badge that measures external beta and gamma radiation. The badge system is a scarcely noticeable part of the uniform or equipment of a great variety of workers from dental assistants to reactor maintenance personnel.

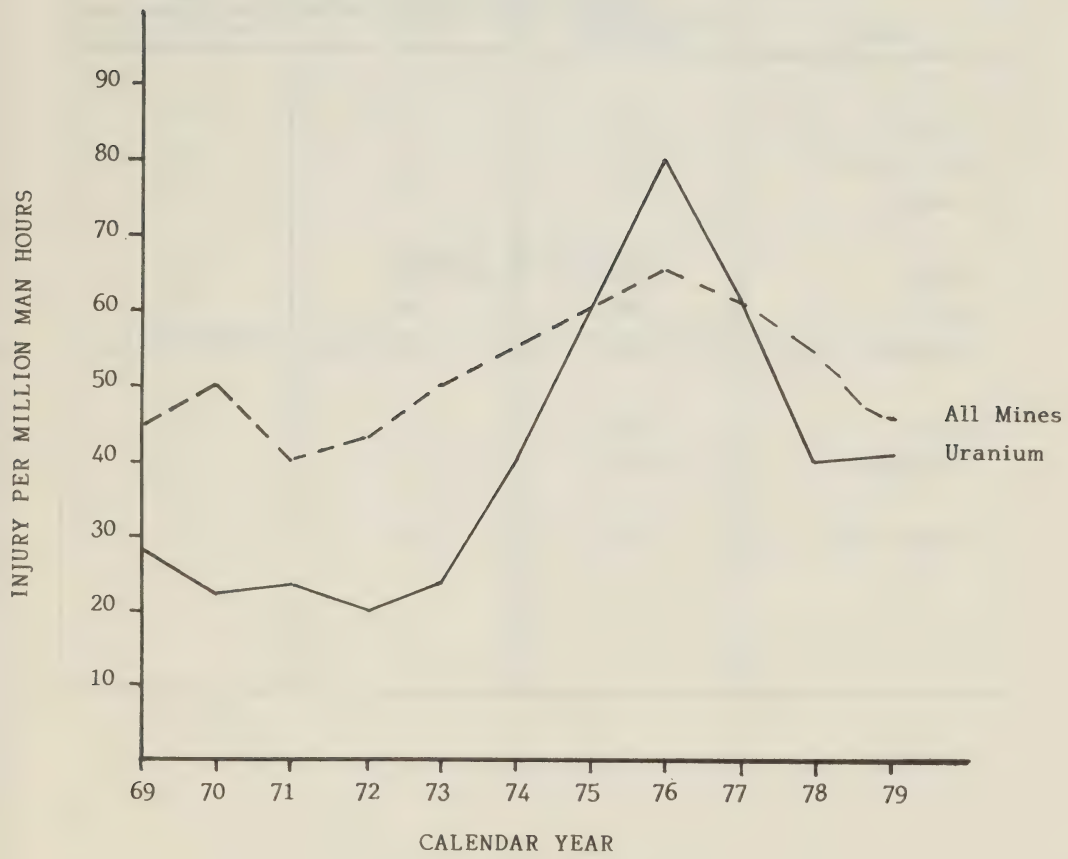
If the system is implemented in the manner suggested during the hearings, the WLM limit will be extended from 4 to 5 to compensate for the fact that at 4 WLM it was assumed that there would be some unaccounted gamma radiation. The increase in the WLM limit could mean that for some workers the effective standard is being relaxed. The Committee believes that this is a bad time for any potential relaxing of a radiation protection standard.

Throughout this and earlier hearings, it was made abundantly clear that radiation protection standards and the basis of their establishment are controversial matters. On the urging of the Ham Commission, the Ontario Ministry of Labour in conjunction with the AECB and other organizations are conducting what is considered to be the most definitive and potentially most significant studies of the effects of radiation exposure on Ontario miners. The study, under the leadership of Dr. Jan Müller, is within a year of producing definitive results. The study may or may not justify the new combined radiation approach; it may or may not suggest another approach, such as a lifetime exposure limit. Until its results are known there should be no action that could be construed as loosening standards.

> RECOMMENDATION 15: CURRENT WORKING LEVEL MONTH LIMITS SHOULD BE MAINTAINED WHEN THE NEW AGGREGATED STANDARDS ARE INTRODUCED. NO ACTION THAT COULD BE INTERPRETED AS LOOSENING RADIATION PROTECTION STANDARDS SHOULD BE TAKEN UNLESS JUSTIFIED BY THE MOST CURRENT EPIDEMIOLOGICAL STUDIES, SUCH AS THOSE BEING COMPLETED BY DR. MÜLLER.

Exhibit 2-I

LOST TIME INJURY RATE IN ONTARIO MINES AND ONTARIO URANIUM MINES (1969 - 1979)



Source: Workman's Compensation Board

Exhibit 2-II

NINE ONTARIO MINES WITH SUPERIOR RECENT SAFETY RESULTS

MINE	INJURY RATE PER MILLION MAN HOURS		
	Employees	1979	Jan-July '80
Campbell	374	14	10
Kerr Addison	355	5	14
Pamour	1,146	10	7
Adams	429	11	12
Griffith	506	16	0
Sherman	486	12	12
Geco	689	14	8
Texasgulf	3,235	5	2
Madawaska	404	13	13

SOURCE: Mines Accident Prevention Association of Ontario

CHAPTER 3

URANIUM MINING AND THE ENVIRONMENT

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The mining industry has the potential of seriously straining the environment. The mines at Elliot Lake, for example, have caused and may continue to cause severe damage to the surrounding area. Operations 20 to 25 years ago severely polluted substantial bodies of water in the Serpent River watershed. Hundreds of thousands of tons of a slightly radioactive, acid-generating, fine gravel – the waste from the uranium mills – have been and continue to be dumped into natural valleys that once contained fresh water lakes and ponds. Hundreds of thousands of gallons of pure fresh water are diverted from the nearby rivers for use in the mines (to control dust) and the mills (as an integral part of the uranium extraction process).

The mining of uranium also creates a special long-term problem, one that could continue to impact the human environment for 250,000 years. The ore which remains after processing to remove uranium is now left on the surface as tailings. It contains several other radioactive elements. Thorium decays into radium then radon and other radioactive elements with a half life of about 80,000 years. Exhibit 3-I illustrates the decay chains of three thorium isotopes. It takes nearly one quarter million years for the thorium in the tailings pile to decay to one-eighth of its original concentration.

The Committee found that considerable improvement had been made in managing the short-term environmental consequences of uranium mines. The long term problem however, remains to be solved.

OPERATING WITH AN ACCEPTABLE ENVIRONMENTAL IMPACT

In 1979 the Ontario Environmental Assessment Board concluded its two year review of the proposed expansion of the uranium mines in Elliot Lake by agreeing that the mining operation could proceed with acceptable environmental consequences. This conclusion permitted a doubling of production in the area with no increase in environmental damage, and is indicative of the progress that has been made over the last twenty years. Examples of the innovations made in the handling of waste products of uranium mining are:

- All mine water is recycled through the mill processes, released to the tailings enclosures and treated in settling ponds before being released back to the watershed. High acidity is being slowly flushed out of the rivers and the radium content is gradually reducing;

- In the past, mine water pumped directly into the Serpent River watershed both destroyed aquatic life in the river because of its high acidity and made the water unfit to drink because of the high radium levels; and

- All the tailings areas, including those of abandoned properties, have been brought under the management of one of the two operating companies. Effluent treatment systems are in place, seepage is collected and treated tailings dams have been stabilized. In some places, artificial and natural revegetation has begun on tailings piles where operations have ceased. In the past, tailings impoundments were not designed or

engineered with sufficient care to prevent seepage of radium and acidity and failure of dam enclosures.

The environmental impact of mining is currently more benign than it has been in the past. And, the expansion program may have a positive impact on the environment because it will keep the companies working to improve local conditions for a long period of time. The vigilance of officials from both the provincial and federal government agencies, working with the AECB, provide the public with a reasonable assurance that the companies will continue to operate to high environmental standards.

There are, however, five specific areas where the Committee has found a need for change or specific action. These are:

- changing the milling process at Denison;
- amassing better information on accumulation of waste elements in plant and animal life;
- improving the system for approving housing sites on mining property;
- providing better information channels for local residents; and
- taking steps to redress the wrongs perpetrated on the Serpent River Indian Band.

First, concerted action is required to change the milling process at Denison. The company uses a process that results in the release of high levels of ammonia into the watershed. As yet, the ammonia has not created difficulties because there is still a high level of acidity in the receiving water systems. This will not always be the case. At the Environmental Assessment Board hearings, it was suggested that Elliot Lake mills could operate satisfactorily on a different process – the LAMIX process – and thus eliminate the use of ammonia. The Ministry of the Environment and the AECB both favour this process. Unfortunately, the LAMIX process leaves traces of magnesium, and one of Denison's American customers requires delivery of material free of such impurities. Since Denison operates out of one very large mill, this one customer's requirements essentially preclude changing all Denison's production. More ironic is the fact that if the material were being shipped in the most advanced form possible – which would be consistent with government policy – it would be refined at the Canadian owned facility of Eldorado Nuclear, which can accept material from the LAMIX process. While it appears that Eldorado currently does not have the capacity to handle this additional volume the proposed expansion of its facilities may offer a unique opportunity to implement this change.

RECOMMENDATION 16: THE AECB SHOULD GIVE DENISON MINES LIMITED A SPECIFIC TIME LIMIT FOR THE CONVERSION OF ITS MILL TO THE LAMIX PROCESS OR ONE THAT PROVIDES EQUALLY ACCEPTABLE ENVIRONMENTAL CONSEQUENCES.

Second, work must be started to determine the effects, if any, on plant and animal life created by nearly thirty years of depositing mildly radioactive materials in the rivers and lakes and on the tailings piles. The Committee found that its own questions on this subject could not be answered.

Tailings piles are being revegetated and wildlife, including burrowing animals, moose and deer, are eating the new vegetation. Substantial quantities of radium in the form of an insoluble salt continue to be deposited on riverbeds in the area. When the Committee was studying high

level nuclear fuel waste disposal, it was presented with some interesting conclusions on the effect of gamma radiation on plant and animal life. The same information should be available to assess fully the impact of the low level radiation from mining operations on flora and fauna.

> RECOMMENDATION 17: THE AECB SHOULD REQUIRE URANIUM MINING COMPANIES TO INITIATE RESEARCH ON THE ABSORPTION OF RADIOACTIVE ELEMENTS IN VEGETATION GROWING ON TAILINGS AND DOWNSTREAM FROM EFFLUENT DISCHARGE. THE RESEARCH SHOULD IDENTIFY THE EFFECTS ON BOTH PLANT AND ANIMAL LIFE.

Third, more specific precautions must be taken in siting housing on mine property or near tailings areas. The Committee was initially concerned by the positioning of a construction camp within the two kilometre exclusion zone suggested by the Environmental Assessment Board. Further, mines, often have housing for senior management, crew trailer camps and bunkhouses on mine property. The Ministry of the Environment has not accepted the two kilometre exclusion zone; it suggests site-specific assessment of each proposed housing area. The Committee can accept the rationale for the Ministry approach; however, the Ministry must be able to support its approach with specific standards against which the acceptability of a site can be assessed before construction takes place. At present such pre-construction standards are not available. After building, the Ministry of Labour installs monitors to check the buildup of "radon daughters" inside the facilities as a result of any natural radiation from the soil. The Building Code standard of no more than .02 Working Levels is then applied in assessing the suitability of the housing.

> RECOMMENDATION 18: THE AECB SHOULD ESTABLISH A STANDARD FOR CONCENTRATIONS OF AIRBORNE RADIATION; THE MINISTRY OF LABOUR SHOULD ESTABLISH STANDARDS FOR MAXIMUM ALLOWABLE RADIATION LEVELS AT ANY HOUSING SITE LOCATED ON A MINE PROPERTY; AND MONITORING FOR THESE STANDARDS SHOULD BE REQUIRED IN ADVANCE OF CONSTRUCTION AND BEFORE LOCATION OF ANY PERSONNEL.

Fourth, more formalized mechanisms are required to inform the people who live near mining properties about the impact of the mining and milling operations on their environment. At the Elliot Lake public meeting, many private citizens voiced their concerns about levels of radiation in the air and water. Concerns also exist about the safety of town drinking water, about reported spills at the Panel mine, and about the radiological consequences of alternative treatment of abandoned tailings piles. The Committee found that in virtually every case there is information that could have been provided to the community to allay the current high level of uncertainty. Unfortunately, there is no mechanism for channeling information and concerns to and from the companies and regulatory agencies. A Public Monitoring Committee established with representatives of various community groups and interests in the Elliot Lake area, including representatives of the nearby Indian Band, could provide the necessary link.

> RECOMMENDATION 19: THE MINISTRY OF THE ENVIRONMENT SHOULD ENSURE THE ESTABLISHMENT OF A PUBLIC MONITORING COMMITTEE, MADE UP OF PRIVATE CITIZENS, INCLUDING THE INDIAN BAND, IN THE ELLIOT LAKE AREA. THE COMMITTEE SHOULD RECEIVE ALL REGULAR ENVIRONMENTAL MONITORING INFORMATION AND ALL REPORTS ON UNUSUAL INCIDENTS OF AN ACTUAL OR POTENTIALLY HARMFUL NATURE. FURTHER, IT SHOULD MEET

REGULARLY WITH COMPANY AND REGULATORY STAFFS AND SHOULD PROVIDE A CHANNEL TO THE COMPANIES AND REGULATORS FOR COMMUNITY INQUIRIES AND COMPLAINTS. FINALLY, IT SHOULD REPORT ANNUALLY TO THE LOCAL MUNICIPAL COUNCIL AND THE SERPENT RIVER INDIAN BAND.

Fifth, the Serpent River Indian Band must gain some redress for the problems that have been created by the operation of uranium mines on the Serpent River watershed. As the Band explained to the Committee, the early operation of the mines (during the fifties) saw highly acidic effluent dumped into the rivers. The Band believes that this destroyed the fishing and trapping base of its economic life. The Band has never received any compensation for this. Apparently, as a partial recompense, an acid plant was built by Canadian Industries Limited on reserve land to supply the mills at Elliot Lake. Rent for use of reserve land would have given the Band some financial interest in the Elliot Lake developments. However, the operation was closed in 1963 leaving a dirty plant and piles of acid generating material trucked in from other areas on the site. Apparently, the lease negotiated for the Band by the Department of Indian Affairs and Northern Development contained no provision for cleaning up the site.

The Environmental Assessment Board, like the Select Committee, heard the Band's many concerns. The Board believed that some of the Band's concerns (such as those relating to the quality of drinking water) could be alleviated by better communication with the companies and government agencies. The Committee believes that participation on its recommended Public Monitoring Committee should provide a channel for improved information. The Band's other concerns, as the Environmental Board suggests, seem to demand response from the Federal Government — a response that has been far too slow in coming.

RECOMMENDATION 20: THE FEDERAL AUTHORITIES SHOULD RESOLVE THE CONCERNS OF THE SERPENT RIVER INDIAN BAND WITH ALL POSSIBLE HASTE.

GETTING ACTION ON THE LONG-TERM PROBLEM

Many Committee witnesses identified tailings as the main environmental hazard of the nuclear fuel cycle. By 1985 the total throughput of all operating mills at Elliot Lake will be over 30,000 tonnes per day, seven days a week, 52 weeks per year. At that rate about 10 million tonnes a year of waste material - tailings - will be added to about 100 million tonnes already produced at Elliot Lake.

A recently published U.S. generic environmental impact study calculated a potential 6,000 fatalities from exposed tailings piles over 1,000 years. A study by Energy Probe of the potential effects from radon releases calculated about 60,000 fatalities from Elliot Lake tailings over 111,000 years. Although neither estimate claims absolute accuracy, each illustrates the potential hazard from uranium mill tailings, the need for better ways to quantify the problem and the need to take into account the long-term picture in handling tailings today.

Tailings, in the form of ground-up rock, are mildly radioactive and mildly contaminated with various process chemicals. Since the host rock in the Elliot Lake area contains a large proportion of pyrites, the rock has a propensity for continuing to generate acids for thousands of years. As well, the small quantities of thorium in the waste will continue to replenish the radium and then radon and its daughter products for several hundred thousand years. The waste material is of enormous quantity but is only mildly dangerous. The problem, as one witness succinctly put it, is that it is too dangerous to be comfortable with and not dangerous enough to be terrified about.

Another important characteristic of the waste material is that the actual hazard it poses to human life and the environment is not very well known. Two main hazards are usually singled out. First, a special problem at Elliot Lake is that the pyrites in the waste pile can cause the radium to be leached out into the streams and lakes that eventually flow into the Great Lakes. Second, the radon produced through natural decay chains is a gas that can be exhaled from the top layers of the waste pile and taken into the atmosphere for general distribution.

Although the hazards can be identified in general terms, they cannot as yet be accurately quantified. There is insufficient information on the routes by which contaminants may reach man or other biological life. Quantities of radium, for example, have already been deposited on the beds of streams as insoluble salts. No one knows how long the radium will remain insoluble, under what conditions it might change in form or how quickly, and through what pathways, it could eventually reach man. Further, even if estimates are made of the release of radioactivity in various forms, there is no precise information on its effect on health; the subject of low level radiation health effects is highly controversial (as has already been outlined in previous reports of this Committee).

The Committee found, in its hearings, that a substantial amount of work dealing with tailings has begun in the last few years. At Elliot Lake, all the tailings piles are now under the control of one of the operating companies and, in the Bancroft area, the tailings pile of Faraday Mines is now controlled by Madawaska Mines Limited. Remedial work has been undertaken where required on the older tailings piles to stabilize the enclosures and to treat the seepage. Seepage and decant streams are treated with lime materials to reduce excess acidity and with barium sulphate to remove most of the soluble radium. Revegetation experiments have begun to stabilize the material, thereby reducing blowing of contaminated dusts and encouraging surface run-off of rain water. The companies at Elliot Lake have sponsored environmental assessment studies by James F. Maclaren Limited that give them some confidence that long-term disposal is feasible.

At the same time that the companies have been active, government agencies have also been at work. The Atomic Energy Control Board has just issued proposed guidelines setting out the specific emission criteria that engineering solutions must assure and proposing the establishment of funding for remedial and monitoring work. At the moment, AECB does not foresee the possibility of a total "walk away" solution. Another government organization, the Canada Centre for Mineral and Energy Technology (CANMET), has recently begun to organize a national program for research into disposal methods. This approach is appealing because uranium tailings are already found in Ontario, Saskatchewan and the Northwest Territories and could become a problem in other areas if new exploration proves successful. Further, most uranium produced in Canada (and even 75% of that produced at Elliot Lake) is exported to other countries adding to the national wealth and aiding our balance of payments.

Despite the recent improvements and new initiatives, there is still no agreement even on the best direction for a solution. Long term tailings disposal remains an unsolved problem highlighted by the Committee's two specific concerns: the lack of progress on research, and the absence of assured long term responsibility.

Breaking the Research Impasse

Several alternative approaches have been suggested in this and other investigations of tailings disposal. They include:

- separation of the more dangerous long-lived elements (such as thorium and radium) for underground disposal in abandoned mines;

- contouring and vegetation of piles to reduce the seepage of water bearing contaminants from the piles into the environment;

- covering the tailings piles with several feet of backfill before contouring and vegetation to reduce airborne radioactive releases as well as seepage;

- placing all tailings in deep lakes where the water cover will prevent the generation of acid (and subsequent leaching of radium) and provide shielding for the release of radon gas; and

- reprocessing all tailings to remove thorium as a fuel source for CANDU in the next century and thus reduce the long term radioactive potential of the remaining material.

Insufficient work has been done to justify either concentrating on or eliminating any of the proposals. One of the current frustrations is that there appears to be an impasse on research. The companies are unwilling to commit themselves to major new research programs until governments indicate whether some solutions are favoured over others. Conversely, governments are unwilling to commit to any particular solutions until enough work is done on a national program, and the national program has not begun because it requires agreement and co-operation between many groups.

The Committee believes that the research impasse can be broken with a clear division of responsibility:

- Company responsibility should be to conduct all research necessary to demonstrate that their suggested approach (basically contouring and vegetation) will meet AECB criteria. Such research should demonstrate that tailings enclosures will keep the waste material in a stable configuration, that radiation loadings from all sources and in all conceivable circumstances can be reliably estimated and that more dangerous materials such as the barium radium sulphate sludge in the settling ponds will not redissolve, or will do so in an acceptable, predictable way. These areas are legitimately the responsibility of the companies because the problems and solutions are particular to the specific mines and local environment and because the companies, like other companies in the nuclear industry, should be attempting to produce their own solutions to meet AECB criteria;

- Government responsibility should be to conduct research into areas of more general application across the country, and possibly those of a more non-conventional type. For example, government (through CANMET) could lead research into the feasibility and practical effect of placing material in deep lakes or of developing a thorium fuel cycle; and

- Joint responsibility should be to conduct research on separation and backfill. Government is legitimately involved because the approach has national potential. The companies should be involved because some aspects of the approach are specific to local conditions.

RECOMMENDATION 21: THE URANIUM MINING COMPANIES SHOULD BE DIRECTED TO INITIATE RESEARCH TO SUBSTANTIATE THEIR ASSERTIONS THAT SURFACE TAILINGS

PILES CREATE NO LONG-TERM PROBLEMS. FURTHER, GOVERNMENTS SHOULD BE DIRECTED TO INITIATE A MORE AGGRESSIVE RESEARCH PROGRAM INTO ALTERNATIVE APPROACHES TO LONG-TERM PROBLEMS. FINALLY, THE URANIUM MINING COMPANIES AND THE GOVERNMENTS SHOULD IMMEDIATELY INITIATE JOINT RESEARCH ON SEPARATION AND BACKFILL.

Establishing Long-Term Responsibility

The U.S. Nuclear Regulatory Commission has established standards and criteria requiring uranium mining companies to post performance bonds and to provide funding for long-term monitoring and rehabilitation of abandoned tailings piles. This step was taken when it was discovered that many small U.S. operations had been abandoned in an unacceptable way and that many more mines with relatively short lives were under licence. Financial guarantees are accepted as a necessary principle by the AECB and the Ontario Ministry of the Environment, but details have not yet been agreed on.

Canada has not experienced the problems resulting from mine closures that the U.S. has had to face. Denison and Rio Algom have long-term contracts and Madawaska Mines has reopened the abandoned Faraday property. There are, however, at least two operations in the Bancroft area that are probably now a public responsibility although, fortunately, the Bancroft area tailings do not pose the same problem as those at Elliot Lake. As well, another uranium operation at Agnew Lake may soon be closing and there is no legal requirement to ensure the company there will carry out its long-term responsibility.

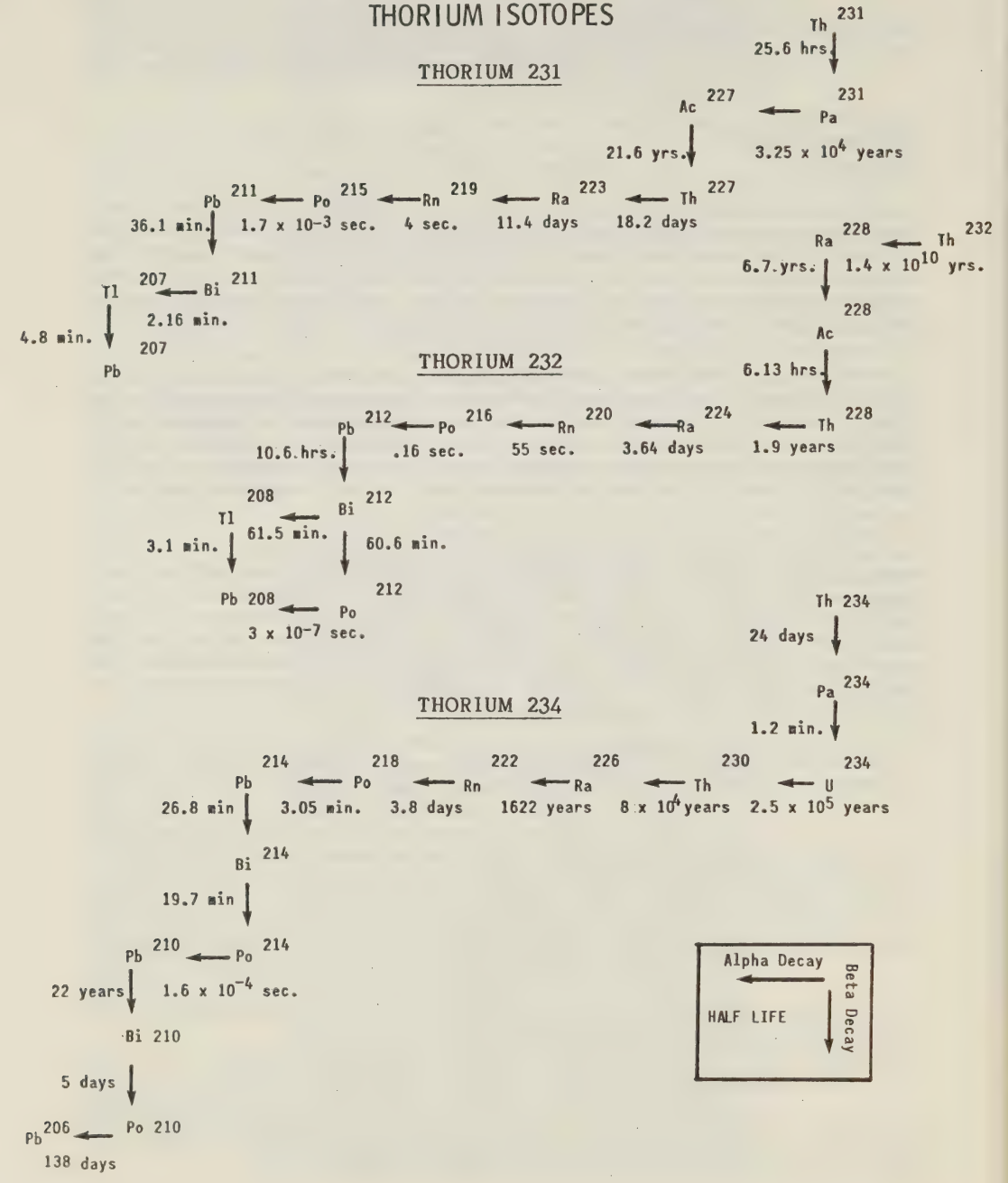
It is imperative that regulations be enacted immediately to ensure that long-term responsibility is properly assumed by the industry that creates the long-term problem. Since most Canadian uranium is exported, failure to build long-term costs into export contracts means that Canadians will end up paying for the clean-up costs associated with material used for the advantage of other nations. The Committee did not devote sufficient time in its hearings to recommend specific financial arrangements; a mechanism is nevertheless required. The funding arrangement should give companies an incentive to find and prove an appropriate solution without reducing their incentive to spend on research.

RECOMMENDATION 22: THE AECB SHOULD BE EMPOWERED TO ESTABLISH A SURETY FUND ARRANGEMENT TO BE APPLIED TO EACH LICENCED URANIUM MINING AND MILLING OPERATION. THE FUNDING SHOULD BE BASED ON THE VOLUME OF MATERIAL PLANNED FOR THE SITE, ITS SPECIFIC NATURE AND SPECIFIC SITE CONDITIONS. COMPANIES SHOULD RECEIVE CREDITS AGAINST ANNUAL FUNDING REQUIREMENTS IN RETURN FOR SPECIFIC EXPENDITURES ON LONG-TERM STABILIZATION PROJECTS, AND FUNDING SHOULD BE REDUCED AS COMPANIES ARE ABLE TO ESTABLISH EFFECTIVE LONG-TERM APPROACHES. FUNDING SHOULD INCLUDE PROVISION FOR PERFORMANCE BONDING AS WELL AS FOR MEETING THE LONG TERMS COSTS OF MONITORING AND POSSIBLE REMEDIAL ACTION.

RECOMMENDATION 23: THE ONTARIO MINISTER OF THE ENVIRONMENT SHOULD GIVE DIRECTION AND LEADERSHIP AT ELLIOT LAKE BY RESPONDING AT THE EARLIEST OPPORTUNITY TO THE MANY RECOMMENDATIONS OF THE ENVIRONMENTAL ASSESSMENT BOARD.

Exhibit 3-I

SIMPLIFIED DECAY CHAINS OF THREE THORIUM ISOTOPES



CHAPTER 4

URANIUM REFINING AT PORT HOPE

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In its comprehensive examination of Ontario's nuclear commitment, the Committee set out to examine the "environmental impact and health considerations" related to uranium refining and conversion and found itself dealing with problems of wastes accumulated over the last 50 years and with plans for the future expansion of Canadian refining capacity. This chapter will discuss both issues.

MOVING AHEAD WITH LOW LEVEL WASTE MANAGEMENT

From its inception in 1932, Eldorado produced radium needles from unmilled ore shipped directly from the company's pitchblende mine in the Northwest Territories. The ore contained some 29 different radionuclides, including the minute fraction of radium extracted at the plant, as well as other elements such as uranium and thorium that were left in large waste piles beside the plant. In the 1940s, the waste, which could be described as high grade uranium ore, was reprocessed to extract uranium for the famed Manhattan Project, the Allies' secret program to produce the world's first atomic bomb. The process wastes, still radioactive but now with uranium and radium extracted, were disposed of at three waste sites purchased or leased by the company in or around the town. However, during this period there was little if any concern about the disposition of the industrial garbage such as scrap building materials or broken process equipment, from the plant.

By the mid fifties, Eldorado was receiving uranium from 25 mines in Canada. At this time the mines were milling the ore at the mine site and sending a predominantly uranium material called yellowcake to the refinery. Eldorado extracted uranium from the impurities in the yellowcake to produce uranium trioxide for the nuclear weapons program of the United States and United Kingdom. A further site was acquired outside the town at Port Granby to receive the plant's process wastes and industrial garbage.

Today, far greater care is taken in handling uranium, process chemicals and wastes. The main waste product, called raffinate, is now recycled through the uranium mills at Elliot Lake. Greater care is taken to identify and decontaminate, recycle or dispose of other chemical wastes and plant garbage. The garbage that is still sent to the Port Granby site is now buried in trenches.

As has been indicated earlier, in the mid 1970s, the Atomic Energy Control Board turned its attention from primary concern with the security of nuclear materials to a more general concern with public health risks from radiation. One element of their new concern was the risk to the public from past activities with nuclear material. Board staff conducted a cross-Canada survey and discovered many locations where low-levels of radioactivity from old processes could be found. The locations included buildings built on fill from uranium mines, plants where radioactive materials had once been used and houses contaminated with material from a nuclear industry by previous occupants. A federal-provincial task force was set up to deal with these problems. It is chaired by the President of the Atomic Energy Control Board and made up of representatives of various federal agencies and of the provinces of Ontario, Saskatchewan and Quebec. The technical secretary and all administrative arrangements are handled by the AECB and the federal government has assumed all the costs of clean-up until ultimate financial responsibility is being resolved.

A second element of AECB's new concern was that existing and operational nuclear facilities, including the associated waste sites, be operated to a very high technical standard and within regulatory limits for radioactive emissions to the environment.

Port Hope became a primary area of AECB activity. Early operation of the radium refinery resulted in hundreds of houses and many ravines and vacant lots being contaminated by radioactive scrap material. The task force directed a massive clean up in the area. Thirty-five hundred homes were surveyed with 400 requiring remedial action. Seven million dollars was spent on clean-up involving demolition of two houses, installation of sub-floor ventilation in several others, decontamination of a few hundred residential properties and movement of 105,000 tonnes of contaminated fill and other material to a waste repository on AECL property at Chalk River. The Chalk River site is now filled and closed; all the homes have been decontaminated. However, there are still about 200,000 tonnes of waste material in ravines and open areas that cannot be moved until a new waste repository is established.

The AECB also pressed Eldorado to improve the operation of their waste management sites at Welcome and Port Granby. As a result of a directive issued in 1976 both sites were substantially upgraded. Seepage is now collected and treated before it is released to Lake Ontario. At the point of release, the effluent meets provincial drinking water standards with a radium content of less than 3 picoCuries per litre. The AECB has also concluded that the Port Granby and Welcome sites are not satisfactory for the long-term. Although extensively vegetated now, the Port Granby site is subject to erosion and the seepage collection system was unable to cope with the extensive flooding that occurred in the spring of 1980. Eldorado has been directed to begin to work toward a long-term solution.

The AECB has served the public interest at Port Hope well in the last few years. It urged immediate clean-up action despite disputes over jurisdiction and responsibilities. The AECB is continuing to press for a satisfactory long-term disposal solution. This Committee commends the AECB for its initiatives and successes.

There are, however, problems that remain. A permanent disposal site is required for the large quantities of low and intermediate level wastes, including the 200,000 tonnes in Port Hope ravines, the material at Port Granby and Welcome and material being stored by AECL and Ontario Hydro. The material in Port Hope ravines is of special concern because it is lying behind an eight foot chain link fence within the residential areas of the town. The only warning is a series of small yellow signs with black "KEEP OUT" lettering. Neither the fencing nor the signs are adequate. The waste clean-up team has found 'hot spots' in these areas and fairly heavily contaminated material has been uncovered during heavy rainfalls.

> RECOMMENDATION 24: THE AECB SHOULD ENSURE THE INSTALLATION OF IMPROVED SECURITY FENCING, PROMINENTLY MARKED WITH APPROPRIATE WARNING SIGNS, AROUND THE RADIOACTIVE WASTE MATERIALS IN PORT HOPE.

The clean-up program cannot proceed without a new site for transfer of the material. A new site cannot be found until some organization conducts the research necessary to show how the site can be managed and what physical requirements it must meet, yet there is no organization with a mandate to do any of the necessary work.

The AECB recognizes the problem and has correctly realized that as a regulatory authority it cannot proceed as the waste management agency. The Committee has already recommended the establishment of a nuclear fuel waste management agency with national overall responsibility for dealing with high level wastes. The mandate of that agency could be broadened to include all the wastes from the nuclear fuel cycle other than those of mining. There will undoubtedly be many areas where work on high and low level wastes will be mutually supportive, including technical areas such as environmental pathways analysis and hydrogeology, and non-technical areas of community relations and dealing with environmental and regulatory authorities.

RECOMMENDATION 25: THE GOVERNMENT OF ONTARIO SHOULD URGE THE FEDERAL GOVERNMENT TO ESTABLISH A NUCLEAR WASTE MANAGEMENT AGENCY TO DEAL WITH ALL WASTE PRODUCTS ASSOCIATED WITH THE PROCESSING AND USE OF NUCLEAR MATERIAL. THE AGENCY SO ESTABLISHED SHOULD BE RESPONSIBLE FOR MANAGING THE RESEARCH, APPROVAL AND OPERATING PHASES OF THE PROGRAM AND SHOULD BE REQUIRED TO HAVE EACH OF ITS PROPOSALS SUBJECT TO FULL PUBLIC ENVIRONMENTAL ASSESSMENTS.

ENSURING APPROPRIATE PUBLIC INVOLVEMENT IN ELDORADO'S EXPANSION

Eldorado Nuclear produces all the uranium dioxide for CANDU reactors in Canada and around the world. In addition, the refinery has permitted this country to export its uranium in the most advanced form possible, usually as uranium hexafluoride for enrichment and subsequent fabrication into fuel for nuclear powered electric generators. Faced with increasing production potential at Canadian uranium mines, including material from the new Saskatchewan mines and the doubling of capacity at Elliot Lake, Eldorado began, in 1975, to plan for a tripling of its production capacity. A plant was designed for construction near Port Granby and was scheduled to begin production in September, 1980.

As a federal agency, Eldorado's projects are not subject to Ontario's environmental assessment provisions. As a Crown corporation, Eldorado is also exempt from scrutiny by the federal office of environmental assessment. However, Eldorado did voluntarily submit its project to full environmental scrutiny by a Federal Environmental Assessment Review Panel (EARP). Between 1976 and 1979 four environmental hearings were held in Ontario and three sites were approved. Through the hearings and technical reviews it became apparent that Eldorado had designed a plant capable of passing all environmental and employee safety criteria.

After the four year delay for environmental assessment, Eldorado was given permission to proceed at an approved site in Hope Township. After an expenditure of $1.5 to $3.0 million on site preparation, the company was instructed by their Minister to put the refinery at the approved site in Blind River. In the meantime, Eldorado did expand its facility at Port Hope to continue to keep pace with growing Canadian uranium mining production. By 1979, the plant at Port Hope began to experience emission problems. It appeared that the old plant was operating beyond its effective limits.

This year, Eldorado came up with a plan that, in their mind, meets the government's requirement to install refining capacity at Blind River while protecting the employees at Port Hope, improving the emission control at the existing site and tripling its production capacity. The new plan is to build a uranium trioxide refinery at Blind River. This plant will receive all the yellowcake from uranium mills and produce the pure uranium trioxide feed for the Port Hope conversion plants. A new uranium hexafluoride plant would be built on the existing Port Hope site to complement the recently completed uranium dioxide plant. The new plan will permit Eldorado to close the old uranium trioxide plant that has caused the environmental concerns over the past two years.

The Committee found that there is one major problem with the new plan: it is dissimilar in key aspects from the plan earlier approved by the Environmental Assessment Review Panel. It includes a large uranium hexafluoride plant on a small site within the town rather than on a very large site outside the urban area. It also involves a slightly different location at Blind River. Eldorado officials argue that their plans are subject to a full environmental and technical assessment under the direction of the AECB and that there is nothing in any of the reports of

the Environmental Assessment Review Panel to suggest that their new plan is unsatisfactory. Further, the AECB licencing procedures include a public information process and Eldorado has committed itself to a public involvement program that exceeds the minimum requirements of that process. With all these mitigating factors, the company feels that the regulatory lag of a full EARP hearing – in its experience 12 to 18 months – will be too expensive and too disruptive to their work force at Port Hope.

The Committee fully appreciates Eldorado's position. The company is in the frustrating position of attempting to develop a Canadian industry, in keeping with accepted public objectives and with an accepted plant design, while being delayed for over five years by the public process. The Committee also appreciates the concerns expressed by some residents of Port Hope who participated in and accepted the EARP process and are now being asked to accept a large chemical plant inside the town without the benefit of a formal environmental hearing. The Committee has difficulty accepting the fact that Eldorado can contemplate making the decision on their own to proceed without an environmental hearing only because they are a Crown corporation.

The Committee believes that the only just way to treat the company and the public is to eliminate the Crown corporation exemption from the Federal environmental assessment provisions. In that way, if there were a case for bypassing the process, the decision would be made by the Minister of the Environment, not the affected agency. In this particular case, Eldorado should proceed with a time-limited hearing on the specific issue of locating the hexafluoride plant within the town. If the panel cannot assure the Minister that it can work within imposed limits, then the AECB licencing approach with the required public information should be strengthened to ensure that concerned citizens have a full opportunity to probe Eldorado's plans, to make their views known to the AECB, and to receive a public accounting from the AECB for its final decision.

RECOMMENDATION 26: THE GOVERNMENT OF CANADA SHOULD AMEND ITS ENVIRONMENTAL PROTECTION PROCESS TO ELIMINATE THE EXCLUSION OF FEDERAL CROWN CORPORATIONS FROM COMPULSORY REVIEW.

RECOMMENDATION 27: THE FEDERAL MINISTER OF THE ENVIRONMENT SHOULD INSTRUCT THE ENVIRONMENTAL ASSESSMENT AND REVIEW OFFICE TO PREPARE A PANEL FOR AN EXPEDITIOUS HEARING ON THE PROPOSED CONSTRUCTION BY ELDORADO NUCLEAR LIMITED OF A URANIUM HEXAFLUORIDE PLANT AT PORT HOPE. FURTHER, ELDORADO NUCLEAR SHOULD VOLUNTARILY SUBMIT ITS PLANS TO THIS REVIEW.

IF THE FEDERAL MINISTER OF THE ENVIRONMENT CANNOT ASSURE A LIMITED EXPEDITIOUS HEARING, ELDORADO NUCLEAR SHOULD PROCEED THROUGH THE AECB LICENCING APPROACH. THIS SHOULD BE STRENGTHENED BY PROVIDING FOR FUNDING OF PUBLIC GROUPS, PUBLIC AVAILABILITY OF ALL TECHNICAL ASSESSMENTS, AND AN ORDERLY SCHEDULE OF PUBLIC MEETINGS TO PROVIDE INFORMATION, TO ANSWER INQUIRIES AND TO RESPOND TO PARTICULAR CHALLENGES. FURTHER, THE AECB SHOULD, IN ITS FINAL LICENCING DECISION, RESPOND TO ALL EXPRESSED PUBLIC CONCERNS AND BE PREPARED TO REJECT THE LICENCE APPLICATION IF THE PUBLIC INFORMATION PROCESS IS NOT HANDLED IN A SATISFACTORY MANNER.*

*See dissent of members Bradley, Haggerty, Kerrio and McGuigan

DISSENT OF THE FOLLOWING MEMBERS:
Jim Bradley, Ray Haggerty, Vince Kerrio, James McGuigan

We fully support all aspects of the report and recommendations with the exception of Recommendation 27. We believe that the Federal Minister of the Environment can and should impose a nine month limit on the hearing and reporting process of the Federal environmental assessment and review process. Therefore, there is no need to make provision for an alternative procedure that would permit Eldorado to proceed without a formal public hearing.

APPENDIX A

TERMS OF REFERENCE

APPENDIX A

TERMS OF REFERENCE
On motion by Mr. Welch, seconded by Mr. Kerr,
ORDERED, That a Select Committee of the Legislature be

appointed:

First, to inquire into the cost of construction of the two heavy-water plants being built by Ontario Hydro at the Bruce Nuclear Power Development, and report to the Legislature on all factors affecting cost, such examination to include but not be limited to:

(a) The requirements for heavy water, the original estimates of the cost of the plants and the contract signed with the Lummus Company of Canada for the construction of the plants and the conditions placed on the contracts for Canadian content;

(b) The change in the scope of the work required due to changes in plant design after the original estimates were completed;

(c) The effect on the total cost of the plants and their construction schedule due to the cancellation of the fourth plant known as plant "C";

(d) The factors affecting any additional costs incurred by the contractor and Hydro for the supply of major equipment, structural components or other supply items;

(e) The factors affecting escalation of sub-contracts placed by the contractor, or Hydro for work related to the construction of the plants;

(f) The factor affecting labour costs for construction of the plant including escalation of labour rates, work stoppages, union jurisdictional disputes, and the shortage of any labour skills required for construction;

(g) The effect of interest rates, and foreign exchange rates on the overall costs of construction;

(h) The administration of the contract by Hydro and the control methods used to monitor and minimize the cost, and to prepare and submit a report for the Legislature upon the conclusions of this inquiry.

Second, to review the implementation of the recommendations of the Select Committee of the 30th Parliament which examined Ontario Hydro's proposal for bulk power rate increases for 1976; such review to include consideration of Ontario Hydro's status reports tabled by the Ministry of Energy.

Third, to examine Ontario's nuclear commitment, taking into account the report and recommendations of the Royal Commission on Electrical Power Planning and Ontario's Energy Future, such examination to include but not be limited to:

(a) Ontario Hydro's system planning strategy for adopting nuclear power and, in particular:

- Large v. small generating stations;

- o Remote stations v. sites close to urban areas;
- o The ratio of nuclear-fuelled generating stations that should be built in comparison to fossil fuelled stations, keeping in mind security of supply and cost differentials;

(b) The economics of nuclear power v. generation from other primary fuels;

(c) The performance and reliability of nuclear generating stations;

(d) The responsibility for, and the standards relative to the safety of nuclear generation stations;

(e) Environmental impact and health considerations related to nuclear power.

And that the Select Committee may prepare and submit interim reports for the Legislature and shall prepare and submit a final report before the end of December, 1978, and that the Select Committee may request such coverage of its proceedings by Hansard and the printing of such papers as the Committee deems appropriate; and the Committee shall have authority to sit during the interval between sessions and have full power and authority to employ counsel and such other personnel as may be deemed advisable and to call for persons, papers and things, and to examine witnesses under oath and the Assembly doth command and compel attendance before the said Select Committee of such persons and the production of such papers and things as the Committee may deem necessary for any of its proceedings and deliberations, for which the Honourable Speaker may issue his warrant or warrants; and the Committee shall be composed of 14 members as follows: Mr. MacDonald (Chairman), Ashe, Foulds, Gigantes, Haggerty, Handleman, Jones, Kerrio, Lane, Leluk, Nixon, Reed (Halton-Burlington), Samis, and Williams*.

* - Messrs. MacDonald (Chairman), Foulds (Vice Chairman), Ashe, Belanger, Bounsall, Bradley, Cureatz, Haggerty, Havrot, Hennessy, Kerrio, Mackenzie, McGuigan and Williams were members of the Select Committee during its examination of The Mining, Milling and Refining of Uranium in Ontario.

APPENDIX B

CHRONOLOGY OF THE RECORD OF HEARINGS INTO THE MINING AND REFINING OF URANIUM ORE

APPENDIX B

CHRONOLOGY OF THE RECORD OF HEARINGS INTO THE MINING AND REFINING OF URANIUM ORE

Date of Meeting	Name of Organization and Personnel Representatives
July 8, 1980	**Atomic Energy Control Board**
	Smythe, Dr. W. D., Director Fuel Cycle Branch
	Dory, A. B., Manager Uranium Mine Division
	Henry, Dr. L. C., Manager Radioactive Waste Management Division
July 9, 1980	**Rio Algom Limited**
	Culver, K. B., Manager Technical Services
	Bush, J. A., Counsel
	Denison Mines Limited
	Rickaby, A. C., General Manager
	Adams, J., Counsel
July 10, 1980	**United Steelworkers of America, District 6**
	Cooke, S., Director
	Falkowski, P., Co-ordinator Occupational Health and Safety
	Warrian, P., Director Research Department
	Canadian Coalition for Nuclear Responsibility
	Edwards, Dr. G., National Chairman
July 15, 1980 (Elliot Lake)	Tour of Rio Algom Mines Limited
	Underground and surface facilities

Date of Meeting	Name of Organization and Personnel Representatives
July 16, 1980 (Elliot Lake)	Tour of Denison Mines Limited
	Underground and surface facilities
	Public Meeting
	Seguin, Homer Burt, Ed Bishop, Monica Lucatelli, Franco Massicotte, Ernest Stewart, Bill Mellor, David Williamson, Sara Marshall, Elaine
July 17, 1980 (Elliot Lake)	Tour of Denison Mines Limited training facility
	Elliot Lake Centre Presentation
	McCormack Smyth, Dr. D., Chairman of the Board
	de Bastiani, M., past Chairman
	Kidd, W. M., Director of the Centre
	Pearson, Dr. F. G.
	Harris, R. A.
	Kaye, Dr. B. H.
	Serpent River Indian Band
	Johnson, Peter, Band Secretary
July 22, 1980	**University of Toronto**
	Ham, Dr. J., President
	United Steelworkers of America, District 6
	Falkowski, P., Co-ordinator Occupational Health and Safety

Date of Meeting	Name of Organization and Personnel Representatives
July 23, 1980	**Atomic Energy Control Board**
	Dory, A. B., Manager Uranium Mine Division
	Balint, A. B., Member Uranium Mine Division, Elliot Lake
	Stocker, Dr. H., Research Health and Safety Effects
	Labour Canada
	Laframboise, H. L., Assistant Deputy Minister
	Beaton, T., Regional Director Great Lakes Region
	Ministry of Justice, Ottawa
	Bouffard, D., Legal Advisor Department of Labour
	Ministry of Labour
	Armstrong, T. E., Deputy Minister
	Robinson, Dr. A. E., Assistant Deputy Minister Occupational Health and Safety Division
	Fitch, Dr. M., Director Special Studies & Services Branch
	McCrodan, P., Director Mining Health and Safety Branch
	Nelson, H., Director Occupational Health Branch
	Pakalnis, V., Ground Control Engineer Mining Health and Safety Branch
July 23, 1980	**Workmen's Compensation Board**
	McDonald, J. F., Secretary of the Board
July 24, 1980	**Rio Algom Limited**
	Bush, J. A., Counsel

Date of Meeting	Name of Organization and Personnel Representatives
	Culver, K. B., Manager Technical Services
	Black, K., Area Engineer Occupational Health
	Montgomery, I., Area Engineer Ventilation
	Denison Mines Limited
	Chakravatti, J. L., Senior Environmental Engineer
	Provencher, D., Safety and Security Supervisor
	Adams, J., Counsel
	Golder Associates
	Boyd, Dr. J., Consultant Rock Mechanics
	Queen's University
	Thompkins, R. W., Professor Emeritus
July 29, 1980	**Atomic Energy Control Board**
	Dory, A. B., Manager Uranium Mine Division
	Henry, Dr. L. C., Manager Radioactive Waste Management Division
	Environment Canada
	Shantora, V., Manager Pollution Control Division
	Boulden, R. S., Senior Environmental Design Officer Federal Programs Division
July 29, 1980	**Ministry of the Environment**
	Scott, G. W., Deputy Minister
	LaHaye, G. J., District Officer Industrial Abatement, Sault Ste. Marie

Date of Meeting	Name of Organization and Personnel Representatives
July 30, 1980	**Rio Algom Limited**
	Bush, J. A., Counsel
	Culver, K. B., Manager Technical Services
	Denison Mines Limited
	Chakravatti, J. L., Senior Environmental Engineer
	James F. MacLaren Limited
	Chambers, Dr. D. B., General Manager Nuclear Studies
	Gorber, Dr. D. M., General Manager Water and Waste Management Group
July 31, 1980	**United Steelworkers of America, District 6**
	Warrian, P., Director Research Department
	Mackenzie, D., Legislative Representative
	Canada Centre for Mineral and Energy Technology
	Haw, V. A., Acting Director-General
	Joe, E. G., Head Engineering and Economist Evaluation
	Ritchie, G. M., Head Process Metallurgy
August 5, 1980	**Atomic Energy Control Board**
	Henry, Dr. L. C., Manager Radioactive Waste Management Division
August 5, 1980	**Ministry of the Environment**
	Scott, G. W., Deputy Minister
	Balsillie, D., Chief Air Quality, Technical Support Group
	LaHaye, G. J. District Officer Industrial Abatement, Sault Ste. Marie

Date of Meeting	Name of Organization and Personnel Representatives
	Missingham, G. A., Head Municipal Water Unit
	Environment Canada
	Shantora, V., Manager Pollution Control Division
	Boulden, R. S., Senior Environmental Design Officer Federal Programs Division
August 6, 1980	**United States Nuclear Regulatory Commission**
	Miller, H., Leader New Mill Licensing Section
	Scarano, R., Chief Uranium Recovery Licensing Branch
	Private Citizen
	Torrie, R. D.
August 7, 1980	**James F. MacLaren Limited**
	Chambers, Dr. D. B., General Manager Nuclear Studies
	Gorber, Dr. D. M., General Manager Water and Waste Management Group
	Denison Mines Limited
	Chakravatti, J. L., Senior Environmental Engineer
	Rio Algom Limited
	Bush, J. A., Counsel
	Culver, K. B., Manager Technical Services
	Golder Associates
	Davis, J. B., Technical Director
August 12, 1980	**Ministry of Labour**
	Armstrong, T. E., Deputy Minister

Date of Meeting	Name of Organization and Personnel Representatives
	McCrodan, P. B., Director Mining Health and Safety Branch
	Isaac, E. W., Chief Engineer Mining Health and Safety Branch
	Workmen's Compensation Board
	McDonald, J. F., Secretary of the Board
	Atomic Energy Control Board
	Dory, A. B., Manager Uranium Mine Division
	Balint, A. B., Member Uranium Mine Division, Elliot Lake
	Labour Canada, Toronto
	Beaton, T., Regional Director Great Lakes Region
	Labour Canada, Ottawa
	McLellan, J. W., Director Occupational Health and Safety Branch
	Ministry of Justice, Ottawa
	Bouffard, D., Legal Advisor Department of Labour
August 13, 1980	**Philip A. Lapp Limited**
	Whitehead, Dr. J. R., Senior Vice-President
	Ministry of Labour
	Müller, Dr. J., Consultant
	Pollution Probe Foundation
	Wordsworth, A., Researcher
September 16, 1980	**Canadian Environmental Law Association**
	Patterson, G., Counsel
	Vigod, T., Counsel

Date of Meeting	Name of Organization and Personnel Representatives
	Energy Probe
	Rubin, N., Nuclear Power Researcher
September 17, 1980	**Denison Mines Limited**
	Chakravatti, J. L., Senior Environmental Engineer
	Cochrane, J., Mine Training Co-ordinator
	Provencher, D., Safety and Security Supervisor
	James F. MacLaren Limited
	Chambers, Dr. D. B., General Manager Nuclear Studies
	Gorber, Dr. D. M., General Manager Water and Waste Management Group
	Rio Algom Limited
	Culver, K. B., Manager Technical Services
September 18, 1980	**United Steelworkers of America, District 6**
	Falkowski, P., Co-ordinator Occupational Health and Safety
	Shell, D., Counsel
September 22, 1980	**Eldorado Nuclear Limited**
	Dakers, R. G., Vice-President Refining
	Abbatt, Dr. J. D., Medical Adviser
	Frost, S. E., Corporate Health Physicist
	Smith, T. D., Director of Information
	Atomic Energy Control Board
	Smythe, Dr. W. D., Director Fuel Cycle Branch

Date of Meeting	Name of Organization and Personnel Representatives
	Didyk, J., Manager Fuel and Heavy Water Plant Licencing Division
	Henry, Dr. L. C., Manager Radioactive Waste Management Division
September 23, 1980 **(Held in Port Hope, Ontario)**	**Welcome Dump Site**
	Thomas, Winnifred
	Sculthorpe, Robert
	SEAP (Save the Environment from Atomic Pollution) Port Granby
	Lawson, Patricia, Vice-President
	Lowes, Warren, Director
	Port Hope Environmental Group
	Leighton, Linda
	Wittman, Professor Horst
	Goering, Jack
	Pereira, Elizabeth
	Town of Newcastle
	Rickard, Garnet, Mayor
	Clarke, Bill, Councillor
	Hope Township
	Wilson, Roger, Councillor
	Private Citizen - On Behalf of Sports Fishermen
	Astin, Rick
	Town of Port Hope
	Wyatt, Bill, Mayor
	Eldorado Nuclear Limited
	Dakers, R. G., Vice-President Refining

Date of Meeting	Name of Organization and Personnel Representatives
September 24, 1980	**Environment Canada**
	Shikaze, K., Director Environmental Protection Service, Ontario Region
	Llewellyn, S., Manager Federal Programs Division Environmental Protection Service, Ontario Region
	Eldorado Nuclear Limited
	Dakers, R. G., Vice-President Refining
	Frost, S. E., Corporate Health Physicist
	Jarrell, J., Manager Environmental Control
	Smith, T. D., Director of Information
September 25, 1980	**Atomic Energy Control Board**
	Didyk, J., Manager Fuel and Heavy Water Plant Licensing Division
	Henry, Dr. L. C., Manager Radioactive Waste Management Division
September 30, 1980	**Atomic Energy Control Board**
	Eaton, Dr. R. S., Chief Radioactive Remedial Action Group
	Ontario Hydro
	Holt, A. R., Director of Fuels
October 2, 1980	**Committee Meeting with Staff and Members**
October 3, 1980	**Committee Meeting with Staff and Members**
November 12, 1980	**Committee Meeting with Staff and Members**
November 20, 1980	**Committee Meeting with Staff and Members**

APPENDIX C

LIST OF WITNESSES APPEARING BEFORE THE SELECT COMMITTEE ON ONTARIO HYDRO AFFAIRS

APPENDIX C

LIST OF WITNESSES APPEARING BEFORE THE SELECT COMMITTEE ON ONTARIO HYDRO AFFAIRS

Government of Ontario

T. E. ARMSTRONG	Deputy Minister Ministry of Labour
DR. A. E. ROBINSON	Assistant Deputy Minister Occupational Health and Safety Division Ministry of Labour
DR. M. FITCH	Director Special Studies and Services Branch Ministry of Labour
P. MCCRODAN	Director Mining and Health and Safety Branch Ministry of Labour
H. NELSON	Director Occupational Health Branch Ministry of Labour
E. W. ISAAC	Chief Engineer Mining Health and Safety Branch Ministry of Labour
V. PAKALNIS	Ground Control Engineer Mining Health and Safety Branch Ministry of Labour
DR. J. MÜLLER	Consultant Ministry of Labour
G. W. SCOTT	Deputy Minister Ministry of the Environment
D. BALSILLIE	Chief, Air Quality, Technical Support Ministry of the Environment
G. J. LaHAYE	District Officer Industrial Abatement, Sault Ste. Marie Ministry of the Environment
G. A. MISSINGHAM	Head, Municipal Water Unit Ministry of the Environment
J. F. MCDONALD	Secretary of the Board Workmen's Compensation Board

Government of Canada

V. A. HAW	Acting Director – General Canada Centre for Mineral and Energy Technology
E. G. JOE	Head Engineering and Economist Evaluation Canada Centre for Mineral and Energy Technology
G. M. RITCHIE	Head Process Metallurgy Canada Centre for Mineral and Energy Technology
K. SHIKAZE	Director Environmental Protection Service Ontario Region Environment Canada
S. LLEWELLYN	Manager Federal Programs Division Environmental Protection Service Ontario Region Environment Canada
V. SHANTORA	Manager Pollution Control Division Environment Canada
R. S. BOULDEN	Senior Environmental Design Officer Federal Programs Division Environment Canada
H. L. LAFRAMBOISE	Assistant Deputy Minister Labour Canada, Ottawa
T. BEATON	Regional Director Great Lakes Region Labour Canada, Toronto
J. W. MCLELLAN	Director Occupational Health and Safety Branch Labour Canada, Ottawa
D. BOUFFARD	Legal Advisor Department of Labour Ministry of Justice

Atomic Energy Control Board

DR. W. D. SMYTHE	Director Fuel Cycle Branch

Automatic Energy Control Board (continued)

J. DIDYK	Manager, Fuel and Heavy Water Plant Licencing Division
A. B. DORY	Manager Uranium Mine Division
DR. L. C. HENRY	Manager Radioactive Waste Management Division
DR. H. STOCKER	Research Health and Safety Effects
A. B. BALINT	Member Uranium Mine Division, Elliot Lake
DR. R. S. EATON	Chief Radioactive Remedial Action Group

Ontario Hydro

A. R. HOLT	Director of Fuel

Rio Algom Limited

K. B. CULVER	Manager Technical Services
J. A. BUSH	Counsel
K. BLACK	Area Engineer Occupational Health
I. MONTGOMERY	Area Engineer Ventilation

Denison Mines Limited

A. C. RICKABY	General Manager
J. L. CHAKRAVATTI	Senior Environmental Engineer
D. PROVENCHER	Safety and Security Supervisor
J. COCHRANE	Mine Training Co-ordinator

Eldorado Nuclear Limited

R. G. DAKERS	Vice-President Refining

Eldorado Nuclear Limited (continued)

DR. J. D. ABBATT	Medical Adviser
S. E. FROST	Corporate Health Physicist
J. JARRELL	Manager Environmental Control
T. D. SMITH	Director of Information

United Steelworkers of America, District 6

S. COOKE	Director
P. WARRIAN	Director Research Department
P. FALKOWSKI	Co-ordinator Occupational Health and Safety
D. MACKENZIE	Legislative Representative
D. SHELL	Counsel

Canada Coalition for Nuclear Responsibility

DR. G. EDWARDS	National Chairman

Canadian Environmental Law Association

G. PATTERSON	Counsel
T. VIGOD	Counsel

Energy Probe

N. RUBIN	Nuclear Power Researcher

Golder Associates

DR. J. BOYD	Consultant, Rock Mechanics
J. B. DAVIS	Technical Director

James F. MacLaren Limited

DR. D. B. CHAMBERS	General Manager Nuclear Studies

James F. MacLaren Limited (continued)

DR. D. M. GORBER	General Manager Water and Waste Management Group

Pollution Probe Foundation

A. WORDSWORTH	Researcher

United States Nuclear Regulatory Commission

H. MILLER	Leader New Mill Licensing Section
R. SCARANO	Chief Uranium Recovery Licensing Branch

Other Witnesses – (in alphabetical order)

Fraser and Beatty

J. Adams
Counsel to Denison Mines Limited

Phillip A. Lapp Limited

Dr. J. R. Whitehead
Senior Vice-President

Private Citizen

Ralph D. Torrie

Queen's University

R. W. Thompkins
Professor, Emeritus

University of Toronto

Dr. J. Ham
President

Private Citizens Appearing at Elliot Lake Public Meeting

Homer Seguin
Ed Burt
Monica Bishop
Franco Lucatelli
Ernest Massicotte
Bill Stewart

Private Citizens Appearing at Elliot Lake Public Meeting (continued)

David Mellor
Sara Williamson
Elaine Marshall

Witnesses Appearing at Special Meeting at Elliot Lake Centre

Serpent River Indian Band

Peter Johnson
Band Secretary

Elliot Lake Centre Programs

Dr. D. McCormack Smyth
Chairman

M. de Bastiani
Past Chairman

W. M. Kidd
Director

Dr. F. G. Pearson
Sputum Cytology Program

R. A. Harris
Dust Program

Dr. B. H. Kaye
Radiation Training

Private Citizens appearing at Port Hope Public Meeting

Hope Township

Roger Wilson
Councillor

Port Hope Environmental Group

Jack Goering
Linda Leighton
Elizabeth Pereira
Professor Horst Wittman

Private Citizen - On Behalf of Sports Fishermen

Rick Astin

SEAP (Save the Environment from Atomic Pollution) Port Granby

Patricia Lawson
Vice-President

Warren Lowes
Director

Town of Newcastle

Garnet Rickard
Mayor

Bill Clarke
Councillor

Town of Port Hope

Bill Wyatt
Mayor

Welcome Dump Site

Robert Sculthorpe
Winnifred Thomas

APPENDIX D

EXHIBITS

APPENDIX D

EXHIBITS

Exhibit #	Title	Date Tabled
G–1	Staff Introduction To The Summer Hearings "Focus on the Front End", Select Committee on Ontario Hydro Affairs, July 8, 1980	July 8, 1980
G–2	"Report of the Royal Commission on the Health and Safety of Workers in Mines"	July 8, 1980
G–3	Presentation to the Select Committee on Ontario Hydro Affairs "An Overview of the Regulation of Uranium Mining, Milling, Refining and Fuel Fabrication" by W. D. Smythe, Director, Fuel Cycle Branch, Atomic Energy Control Board, July 8, 1980	July 8, 1980
G–4	Diagram used by Rio Algom representatives during their presentation. Copies of the overhead slide	July 9, 1980
G–4A	Diagram used by Rio Algom representatives during their presentation. Copies of the overhead slide	July 9, 1980
G–4B	Diagram used by Rio Algom representatives during their presentation. Copies of the overhead slide	July 9, 1980
G–5	"Flow Diagram from Ore to Uranium Concentrate" Rio Algom Limited	July 9, 1980
G–6	Map of Elliot Lake area – showing Operating Mines, Non-Operating Mines, Tailings Management Area and Town	July 9, 1980
G–7	Report "Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion", Volume 1, Background Information, March, 1977 by James F. MacLaren Limited, Consulting Engineers, Planners and Scientists	July 9, 1980
G–7A	Report "Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion", Volume 2, Background Information Update, February, 1978 by James F. MacLaren Limited, Consulting Engineers, Planners and Scientists	July 9, 1980
G–7B	Report "Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion", Volume 4, Environmental Assessment, April 1978 by James F. MacLaren Limited, Consulting Engineers, Planners and Scientists	July 9, 1980

Exhibit #	Title	Date Tabled
G-7C	Report "Environmental Assessment of the Proposed Elliot Lake Uranium Mines Expansion", Addendum 1, by James F. MacLaren Limited, Consulting Engineers, Planners and Scientists September, 1978	July 9, 1980
G-8	Brief submitted by Rio Algom Limited and Denison Mines Limited - "Environmental Assessment Board in the Matter of an Inquiry into Uranium Mine Expansion in the Elliot Lake Area", August 22, 1978	July 9, 1980
G-9	Submissions by Denison Mines Limited to Rt. Hon. Harry C. Parrott, D.D.S., Minister of the Environment On The Final Report of the Environmental Assessment Board into the Expansion of the Uranium Mines in the Elliot Lake Area, July, 1979	July 9, 1980
G-10	Document entitled "Overview of the Denison Mines Limited Operations in Elliot Lake", Ontario, July 9, 1980	July 9, 1980
G-11	"The Final Report of the Environmental Assessment Board On The Expansion of the Uranium Mines in the Elliot Lake Area", May, 1979	July 10, 1980
G-12	"Submission to Summer Hearings of the Select Committee on Ontario Hydro Affairs" by Stewart Cooke, Director - District 6, United Steelworkers of America, July 10, 1980	July 10, 1980
G-13	Outline of a presentation by Dr. Gordon Edwards entitled "Public Health Problems Associated with Uranium Mining - Guessing Isn't Good Enough -"	July 10, 1980
G-13A	Article entitled "Appreciation of the Risks of Low Level Radiation vs. Nuclear Energy", by Karl Z. Morgan, submitted January, 1980 for publication in "Comments on Molecular and Cellular Biophysics"	July 10, 1980
G-13B	Letter from Dr. Victor Archer, Medical Director, U.S. National Institute for Occupational Safety and Health, to Dr. Gordon Edwards - Letterhead of the Department of Health, Education and Welfare, Salt Lake City, Utah., dated January 3, 1977	July 10, 1980
G-13C	Article entitled "Health Effects of Radon-222 from Uranium Mining", by Robert O. Pohl, Physics Department, Cornell University, Ithaca, New York, Search Magazine Volume 7, Number 8, August 1976	July 10, 1980

Exhibit #	Title	Date Tabled
G-13D	Brief on Uranium Tailings presented to the Hon. John Roberts, Minister of Environment, "Nuclear Wastes: A Case of Misplaced Priorities", by Dr. Gordon Edwards, May 27, 1980	July 10, 1980
G-13E	Article entitled "Uranium Mine/Mill Tailings and Radiation Health Effects", by Ralph E. Torrie, December, 1979	July 10, 1980
G-13F	Letter on behalf of the Canadian Coalition for Nuclear Responsibility, from Gordon Edwards to Donald MacDonald, Chairman of the Select Committee on Ontario Hydro Affairs dated January 19, 1978	July 10, 1980
G-13G	Remarks by Victor Gilinski, Commissioner, U.S. Nuclear Regulatory Commission, "NRC Regulation of Uranium Milling Industry: Problems and Prospects", Presented at the Pacific Southwest Minerals and Energy Conference, Anaheim, Calif., May 2, 1978	July 10, 1980
G-13H	Brief Summary of Evidence compiled by Dr. Gordon Edwards for the Select Committee on Ontario Hydro Affairs, on the subject, "Is the Linear Hypothesis Conservative for Low-Dose Alpha Radiation?", July 10, 1980	July 10, 1980
G-13I	Bibliography/Literature Review, by Drs. R. F. Woollard and E. R. Young, "Health Dangers of the Nuclear Fuel Chain and Low-Level Ionizing Radiation", published by the B. C. Medical Assoc., Health Planning Council, Environmental Health Committee, May, 1979	July 10, 1980
G-13J	Newspaper - "The Birch Bark Alliance," Issue Number 6, Spring, 1980	July 10, 1980
G-13K	Direct Quotations and Parenthetic Summaries from Seventeen Basic Documents, compiled by Gordon Edwards for Leo Barry and Hazel Newhook, Ministers of Energy & Environment, Government of Newfoundland and Labrador, "Findings on Uranium Tailings and Nuclear Waste Disposal", March, 1980	July 10, 1980
G-14	Submission by the United Steelworkers of America to the Select Committee on Ontario Hydro Affairs, from Elliot Lake, dated July 16, 1980	July 22, 1980
G-15	Presentation of the Serpent River Indian Band at Elliot Lake, entitled "Select Committee on Ontario Hydro Affairs"	July 22, 1980

Exhibit #	Title	Date Tabled
G-16	One page document entitled, "Denison Training Facilities" (handed out during tour of Denison Facilities)	July 22, 1980
G-17	Document entitled, "Denison Mines Limited, Existing and Proposed Mill Circuit"	July 22, 1980
G-18	Document entitled, "Denison Mines Limited, Tailings Management" (Number 1 "General")	July 22, 1980
G-19	Underground maps and diagrams from Denison Mines Limited, "Underground Tour", dated July 16, 1980	July 22, 1980
G-20	Flow Diagram, "The Extraction of Uranium Oxide from Ore, from Rio Algom at Elliot Lake"	July 22, 1980
G-20A	Flow Diagram, "The Extraction of Uranium Oxide from Ore, from Rio Algom at Elliot Lake"	July 22, 1980
G-21	Presentation by Monica Bishop, Massey, Ontario, on behalf of the North Shore Manitoulin Commercial Fishermen and the constituents of Algoma, Manitoulin, entitled, "Select Committee on Ontario Hydro Affairs" dated July 16, 1980	July 22, 1980
G-22	Presentation by the United Steelworkers of America, District 6, entitled "Remarks in Regard to Occupational Health and Safety of Workers Employed in the Uranium Mines in Elliot Lake" by Paul Falkowski, dated July 22, 1980	July 22, 1980
G-23	Presentation to the Select Committee on Ontario Hydro Affairs entitled "Health and Safety Regulation of Uranium Mining and Milling" by A. B. Dory, Manager of Uranium Mine Division of the Atomic Energy Control Board, dated July 23, 1980	July 22, 1980
G-23A	Submission by the Atomic Energy Control Board of Canada to the Province of British Columbia Royal Commission of Inquiry into Uranium Mining, entitled "Personal Radon Daughter Dosimetry in Uranium Mining in Canada", dated January, 1980	July 23, 1980
G-23B	Document from the Atomic Energy Control Board entitled "Practical Difficulties Related to Implementation of ICRP Recommended Dose Limited in Uranium Mines" by A. B. Dory of the AECB	July 23, 1980
G-24	"Presentation to the Select Committee on Ontario Hydro Affairs, Labour Canada and Occupational Safety and Health in Ontario's Uranium Mining and Processing Industries" by H. Laframboise, Assistant Deputy Minister for Labour Canada, dated July 16, 1980	July 22, 1980

Exhibit #	Title	Date Tabled
G-25	Letter from The Corporation of the Town of Elliot Lake from the Office of the Clerk addressed to Mr. MacDonald, Chairman, along with a series of documents, dated July 18, 1980	July 23, 1980
G-26	Document entitled "Brief of the Ontario Ministry of Labour to the Select Committee on Ontario Hydro Affairs, dated July 23, 1980"	July 23, 1980
G-26A	Appendix to the "Brief of the Ontario Ministry of Labour to the Select Committee on Ontario Hydro Affairs," Volume I	July 23, 1980
G-26B	Appendix to the "Brief of the Ontario Ministry of Labour to the Select Committee on Ontario Hydro Affairs," Volume II	July 23, 1980
G-26C	Document entitled "Statement by T. E. Armstrong, Deputy Minister, to Select Committee on Ontario Hydro Affairs," dated July 23, 1980	July 23, 1980
G-27	Book entitled "The Occupational Health and Safety Act. 1978, and Regulations for Mines and Mining Plants"	July 23, 1980
G-28	Presentation by Rio Algom Limited on Health and Safety	July 24, 1980
G-29A	Comments by Denison Mines Limited on the Implementation of Recommendations Made in the Report of the Royal Commission on the Health and Safety of Workers in Mines, June 1976, for Discussion with the Ontario Select Committee on Ontario Hydro Affairs, July 1980	July 24, 1980
G-29B	Comments on Implementation of Recommendations Made in the Report of the Royal Commission on the Health and Safety of Workers in Mines, in Chapter Four, "Accidents and Injuries," Denison Mines Limited, Elliot Lake, Ontario, July 1980	July 24, 1980
G-29C	Chart labelled Compensible Accident Frequency Comparison, 1965 to 1980, Denison Mines versus Ontario Mining Industry	July 24, 1980
G-29D	Chart entitled Denison Mines Limited Environment, Safety, Health, per Collective Agreements, 1978 to 1981	July 24, 1980
G-29E	List of Fatalities to Denison Mines Limited employees from 1960 to June 1980, dated July 21, 1980	July 24, 1980
G-29F	Booklet entitled, "Your Work Environment, Radiation, Silica Dust, Diesel Emissions," Denison	July 24, 1980

Exhibit #	Title	Date Tabled
G-29G	Booklet entitled, "Nucleus," Publication of Denison Limited - Elliot Lake, Ontario, dated March - April 1980	July 24, 1980
G-30	The 49th annual report of the Mines Accident Prevention Association of Ontario, dated May 1980	July 24, 1980
G-31	Document entitled, 'Presentation to the Select Committee on Ontario Hydro Affairs - Focus on the Front End of the Fuel Cycle; July 29, 31 Session; Environmental Impact of Ongoing Operation', from Mr. L. C. Henry, Manager, Radioactive Waste Management Division AECB, July 29, 1980	July 29, 1980
G-32	Document entitled, 'Submission to the Select Committee on Ontario Hydro Affairs', by Environment Canada, Environmental Protection Service, July 29, 1980	July 29, 1980
G-33	Document entitled, 'Presentation to the Select Committee on Ontario Hydro Affairs', from the Ministry of the Environment, July 29, 1980	July 29, 1980
G-34	Document entitled, 'Presentation to the Select Committee on Ontario Hydro Affairs, A Review of Short Term Environmental Considerations Associated with the Uranium Mines in Elliot Lake, Prepared for Denison Mines Limited and Rio Algom Limited,' dated July 30, 1980	August 7, 1980
G-34A	Set of maps entitled, 'Existing Tailings Radon Emissions'	July 30, 1980
G-34B	Set of maps entitled, 'Existing Tailings Suspended Particulate and Dust Fall'	July 30, 1980
G-34C	Set of maps entitled, 'A Water Quality Model Simulation, Case 5, Expansion-LAMIX'	July 30, 1980
G-35A	The personal background and professional capabilities of Mr. Donald M. Gorber.	July 30, 1980
G-35B	The personal background and professional capabilities of Mr. Douglas B. Chambers.	July 30, 1980
G-36	Photographs accompanying the Rio Algom presentation to the Select Committee on Ontario Hydro Affairs of July 9, 1980	July 31, 1980
G-37	Presentation entitled, 'Environmental Issues in Uranium Mining in Elliot Lake', by Peter Warrian, the Canadian Research Director of the United Steelworkers of America, dated July 31, 1980	July 31, 1980

Exhibit #	Title	Date Tabled
G-38	Document entitled, "Presentation to the Select Committee on Ontario Hydro Affairs on Research Activities on Uranium Mine Tailings Management of the Canada Centre for Mineral and Energy Technology (CANMET)"	July 31, 1980
G-39	Document entitled, 'The Presentation to the Ontario Select Committee on Ontario Hydro Affairs, Focus on the Front End of the Fuel Cycle, August 5 to 7 session, Environmental Effects of the Long-Term Management of Waste.' by L. C. Henry, Manager of Radioactive Waste, Management Division, Atomic Energy Control Board, dated August 5, 1980	August 5, 1980
G-40	Document entitled, 'Long-Term aspects of Uranium Tailing Management, an AECB Discussion Paper on Proposed Interim Close-Out Criteria' by K. Bragg, Waste Management Divisions, Atomic Energy Control Board, presented at the First International Conference on Uranium Mine Waste Disposal, May 19 to 21, 1980, Vancouver, British Columbia	August 5, 1980
G-41	Document entitled, 'Review of Uranium Mill Tailings Management Involving Below-Grade Disposal', by Ross A. Scarano, Chief of the Uranium Recovery Licensing Branch of the United States Nuclear Regulatory Commission.	August 6, 1980
G-42	Document entitled, 'Generic Environmental Impact Statement and Proposed Regulations on United States Uranium Milling Industry', by H.J. Miller, D. E. Martin & K. J. Hamill of the Uranium Recovery Licensing Branch, US Nuclear Regulatory Commission	August 6, 1980
G-43	Series of slides pertaining to US Nuclear Regulatory Commission, Mill Licensing Approach	August 6, 1980
G-44	Presentation by Ralph Torrie entitled, 'Uranium Mine Tailings — What the Record Shows'. It is a review of evidence presented to the British Columbia Royal Commission on Uranium Mining and is prepared by Ralph D. Torrie, August 6, 1980	August 6, 1980
G-45	Document on the letterhead of the United States Nuclear Regulatory Commission. It is the file regulations for uranium mine tailings licensing and a copy of the federal register notice pertaining to regulations on uranium mill tailings licensing.	August 6, 1980
G-46	Document containing the requirements and directions from the Ontario Ministry of Energy to Rio Algom Limited.	August 6, 1980
G-47	Document containing the requirements and directions from the Ontario Ministry of Energy to Denison Mines Limited.	August 6, 1980

Exhibit #	Title	Date Tabled
G-48	Letter on the letterhead of Laurentian University in Sudbury, Ontario, addressed to Mr. Donald MacDonald, Chairman from Brian Kay, Professor of Physics at Laurentian University, dated August 5, 1980	August 12, 1980
G-49	Letter from Sherman Mine, addressed to Mr. P. McCrodan, Director, Ministry of Labour, and signed by Bruce W. Taylor, Mine Manager, dated August 8, 1980	August 12, 1980
G-50	Document addressed to Denison Mines Limited from the Occupational Health and Safety Division of the Mining Health and Safety Branch in Elliot Lake to the attention of Mr. A. C. Rickaby and signed by R. K. Cannon, the District Mining Engineer, dated July 18, 1980	August 12, 1980
G-51	Document from the Occupation Health and Safety Division, addressed to Denison Mines Limited to the attention of Mr. A. C. Rickaby and signed by Mr. Banasuik, dated August 6, 1980	August 12, 1980
G-52	Document describing the organization of the Elliot Lake Office of the Mining Health and Safety Branch	August 12, 1980
G-53	'Brief to the Select Committee on Hydro Affairs Uranium Mining and Mill Wastes in Ontario, by Dr. J. Rennie Whitehead, Ottawa, Ontario, August 1980'	August 13, 1980
G-54	'Draft Generic Environmental Impact Statement on Uranium Milling, Project M-25 of the US Nuclear Regulatory Commission, Office of Nuclear Material Safety and Safeguards'; Volume 1, dated April, 1979	August 13, 1980
G-54A	Volume II and the appendices to the same document of the US Nuclear Regulatory Commission	August 13, 1980
G-55	Submission to the Select Committee on Ontario Hydro Affairs, Miner's Study with Special Reference to Uranium Miners, Ontario Ministry of Labour, J. Müller MD, dated August 13, 1980	August 13, 1980
G-56	Submission to the Select Committee on Hydro Affairs from the Pollution Probe Foundation	August 13, 1980
G-57	Document entitled 'A Role for the Provincial Research Organizations in Research on Uranium Mine and Mill Tailings Disposal', from the Association of the Provincial Research Organizations for Technology and Development, dated January, 1980	August 13, 1980

Exhibit #	Title	Date Tabled
G-58	Document entitled "Presentation to the Select Committee on Ontario Hydro Affairs: Focus on the Front End of the Fuel Cycle; Explanation of Uranium Mine Mill Effluent Requirements for RA-226" by L. C. Henry, Manager, Radioactive Wastes Management Division, AECB, dated September 16, 1980	Sept. 16, 1980
G-59	Letter dated August 25, 1980 addressed to Alan M. Schwartz from J. A. Bush, Counsel to Rio Algom Limited, which has as an attachment to it-a copy of the brief of Rio Algom Limited to Dr. Harry Parrott, Minister of the Environment in respect of the report of the Environmental Assessment Board, dated July 10, 1979	Sept. 16, 1980
G-60	Letter dated August 25, 1980, addressed to Alan M. Schwartz from the Canadian Coalition for Nuclear Responsibility, signed by Gordon Edwards, attached is correspondence from the Canadian Coalition for Nuclear Responsibility dated August 8, 1980, addressed to Maurice Foster, M.P., House of Commons in Ottawa	Sept. 16, 1980
G-61	Survey of Air Conditions in Ontario Mines and Plants of Rio Algom Limited for the Panel Mine, Mines Accident Prevention Association of Ontario for the month of June, 1980	Sept. 16, 1980
G-62	Materials from Energy, Mines and Resources Canada. Letter dated August 13, 1980, addressed to Alan M. Schwartz, from V. A. Haw, Director General. Attached is information the Select Committee requested of CANMET during their appearance before the Committee.	Sept. 16, 1980
G-63	Submissions from the Canadian Environmental Law Association entitled "The Regulatory and Jurisdictional Framework Governing Uranium Mining and Milling: Submissions to the Select Committee on Hydro Affairs", by Grace Patterson and Toby Vigod, Counsel to the Canadian Environmental Law Association, dated September, 1980	Sept. 16, 1980
G-64	Document entitled "An Analysis of Bill C-14, the Nuclear Control and Administration Act", prepared by Energy Probe and the Canadian Environmental Law Association, dated November, 1978	Sept. 16, 980
G-65	Document entitled "Hidden Nuclear Deaths: A Summary Prepared for the Select Committee on Ontario Hydro Affairs", by Norman Rubin, Energy Probe, dated September 16, 1980	Sept. 16, 1980

Exhibit #	Title	Date Tabled
G-66	Document entitled "Denison Mines Limited Management and Organizational Development General Outlines"	Sept. 17, 1980
G-67	Document entitled "Denison Mines Limited Mining Training Course Outlines"	Sept. 17, 1980
G-68	Memorandum to Paul Falkowski from Homer Seguin. Letterhead of United Steelworkers of America, District 6, 20 Alberta Road, Elliot Lake, dated July 28, 1980	Sept. 18, 1980
G-69	Letter and attachments on letterhead of the United Steelworkers of America, 55 Eglinton Avenue East, Toronto, addressed to Mr. D. K. Aynsley, Registrar of the Ontario Labour Relations Board, signed by Lorne Ingle, Solicitor, dated February 17, 1978	Sept. 18, 1980
G-70	Document entitled "Madawaska Mines: Report from the Staff to the Select Committee on Ontario Hydro Affairs", dated September 18, 1980	Sept. 18, 1980
G-71	Document entitled "Short Introduction to Uranium Refining", dated September 18, 1980.	Sept. 18, 1980
G-72	Document entitled "Extracts from the Occupational Health and Safety Act, 1978"	Sept. 18, 1980
G-73	Letter on the letterhead of the Minister of State for Mines, addressed to Mr. Paul Falkowski, Coordinator, Occupational Health and Safety, United Steelworkers of America (No date and not signed by Judy Erola)	Sept. 18, 1980
G-74	"Presentation to the Ontario Select Committee on Ontario Hydro Affairs", by Ronald G. Dakers, Vice-President, Refining, Eldorado Nuclear Limited, dated September, 1980	Sept. 22, 1980
G-75	Report entitled "The Eldorado Epidemiology Project, Health Follow-Up of Eldorado Uranium Workers", prepared for Eldorado Nuclear Limited by ENL project team, dated February, 1980	Sept. 22, 1980
G-76	Small brochure entitled "Refining and Converting Uranium into Nuclear Fuels", from Eldorado Nuclear Limited	Sept. 22, 1980

Exhibit #	Title	Date Tabled
G-77	Presentation to the Select Committee on Ontario Hydro Affairs entitled "An Overview of the Regulation of the Activities of Eldorado Nuclear Limited in Port Hope, Ontario", by W. D. Smythe, Director, Fuel Cycle Branch, AECB, dated September 22, 1980	Sept. 22, 1980
G-78	Document entitled, "Submission to the Select Committee on Ontario Hydro Affairs by the Environmental Protection Service, Environment Canada", dated September, 1980	Sept. 24, 1980
G-79	Document entitled "Revised Guide to the Federal Environmental Assessment and Review Process" from the Government of Canada Federal Environmental Assessment Review Office	Sept. 24, 1980
G-80	Document entitled "Guide to the Conduct of a Public Meeting as Part of the Public Information Program for a Uranium Hexafluoride Conversion Facility" from Atomic Energy Control Board	Sept. 24, 1980
G-81	News Release 76-8 by Atomic Energy Control Board dated July 7, 1976	Sept. 24, 1980
G-82	Brief of the Port Hope Environmental Group dated September 23, 1980	Sept. 24, 1980
G-83	Brief submitted by Patricia Lawson, Vice-President of SEAP (Save the Environment from Atomic Pollution)	Sept. 24, 1980
G-84	Comments on the Port Hope meeting by R. G. Dakers, Vice-President, Refining, Eldorado Nuclear Limited to the Select Committee on Ontario Hydro Affairs dated September 24, 1980	Sept. 24, 1980
G-84A	Correspondence and press releases from Atomic Energy Control Board	Sept. 25, 1980
G-85	Mr. Frost's response to question by Mr. Foulds, M.P.P. concerning direct shipments of materials to Whiteshell Nuclear Research Establishment dated September 22, 1980	Sept. 25, 1980
G-86	Document entitled "Investigation of Lake Ontario Water Quality Near Port Granby Radioactive Waste Management Site" by R. W. Durham and S. R. Joshi, National Water Research Institute, Canada Centre for Inland Waters, Environment Canada	Sept. 25, 1980

Exhibit #	Title	Date Tabled
G-87	Document entitled, "Environmental Impact Statement for a Uranium Hexafluoride Refinery, Hope Township", by Eldorado Nuclear Limited dated September, 1978, prepared by James F. MacLaren Limited	Sept. 25, 1980
G-88	"Technical Review of the Environmental Impact Statement for Eldorado Nuclear Limited's Proposed Uranium Refinery at Port Hope" dated October 16, 1978	Sept. 25, 1980
G-89	"Technical Review of the Environmental Impact Statement for Eldorado Nuclear Limited's Proposed Uranium Refinery at Dill Township, Sudbury", prepared by the Department of Fisheries and Environment, Ontario Region dated October 27, 1980	Sept. 25, 1980
G-90	"Technical Review of the Environmental Impact Statement for Eldorado Nuclear Limited's Proposed Uranium Refinery at Blind River", prepared by Department of Fisheries and Environment, Ontario Region dated November 6, 1978	Sept. 25, 1980
G-91	"Report of the Environmental Assessment Panel, Report on the Eldorado Uranium Refinery, Port Granby, Ontario (French and English)	Sept. 25, 1980
G-92	"Report of the Environmental Assessment Panel, Eldorado Uranium Hexafluoride Refinery, Ontario, dated February, 1979	Sept. 25, 1980
G-93	"Report of the Environmental Assessment Panel, Eldorado Uranium Refinery of Corman Park, Saskatchewan, dated July, 1980	Sept. 25, 1980
G-94	News release entitled, "Radiation Task Force Announced" from the Department of Energy, Mines and Resources, Canada, dated February 19, 1976	Sept. 30, 1980
G-95	Document entitled "Report on The Preliminary Investigation of the Technical and Economic Factors for the First Stage Remedial Measures At Port Hope, Ontario", by The Atomic Energy Control Board from James F. MacLaren Limited, dated April, 1976	Sept. 30, 1980
G-96	News Release entitled, "Criteria Set for Radiactive Cleanup in Canada", from AECB, dated April 7, 1977	Sept. 30, 1980

Exhibit #	Title	Date Tabled
G-96A	Information Bulletin from AECB entitled, "Criteria for Radioactive Cleanup in Canada", dated April 7, 1977	Sept. 30, 1980
G-97	Document entitled "Regulatory Concerns Arising from the Port Hope Situation", by Mr. G. B. Knight, AECB. Presented at the Canadian Nuclear Association Conference in Toronto, Canada, on June 13-16, 1976	Sept. 30, 1980
G-98	Activity diagram entitled "Site Selection Study For Low Level Radioactive Wastes from Port Hope, Stage 1"	Sept. 30, 1980
G-98A	Project schedule entitled "Site Selection Study For Low Level Radioactive Wastes from Port Hope, Stage 1"	Sept. 30, 1980
G-99	Letter addressed to Mr. Donald C. MacDonald, Chairman of the Select Committee from Mr. A. B. Dory, Manager of the Uranium Mine Division of the AECB relating to the Department of Justice opinion that health and safety regulations for uranium mine workers must be under federal jurisdiction and cannot be covered by provincial jurisdiction, dated September 26, 1980	Sept. 30, 1980
G-100	Letter to the Select Committee on Ontario Hydro Affairs, care of Jim Fisher, signed by Elizabeth Pereira, witness re Port Hope Environmental Group. Also attached - an editorial from the Port Hope Evening Guide of Thursday, September 25, 1980	Sept. 30, 1980
G-101	"Statement by P. A. Carloss, Vice-President and General Manager, Elliot Lake Operations, Rio Algom Limited to The Joint Federal Provincial Inquiry Commission into Safety in Mines and Mining Plants in Ontario", dated September 23, 1980	Oct. 2, 1980
G-102	Letter from the Workmen's Compensation Board, from Mr. J. F. McDonald addressed to Jim Fisher, dated September 8, 1980	Oct. 2, 1980
G-103	Letter from Eldorado Nuclear Limited, signed by Mr. David Smith, Director of Information, addressed to Alan Schwartz in response to number of outstanding questions left with Eldorado people	Oct. 2, 1980
G-104	Staff Summary entitled, "Cleaning Up the Front End of the Nuclear Fuel Cycle, Staff Summary to Select Committee on Ontario Hydro Affairs, dated October 2, 1980	Oct. 2, 1980

Exhibit #	Title	Date Tabled
G-105	French version of the registration by the registrar of statutory instruments for Canada. Regulations under the Canada Labour Code adopting the Ontario Act and Regulations by reference, dated May 29, 1980	Oct. 2, 1980
G-105A	English version of the registration by the Registrar of Statutory Instruments for Canada. Regulations under the Canada Labour Code adopting the Ontario Act and Regulations by reference, dated May 29, 1980	Oct. 2, 1980
G-106	Letter addressed to Alan Schwartz from Professor John Laskin of the Faculty of law, University of Toronto, dated August 29, 1980	Oct. 2, 1980
G-107	Letter addressed to Jim Fisher and Alan Schwartz from Energy Probe, signed by Norm Rubin, Researcher, dated October 2, 1980	Oct. 3, 1980
G-108	Presentation to the Select Committee on Ontario Hydro Affairs entitled, "A Review of Long Term Environmental Considerations Associated With the Uranium Mines in Elliot Lake", prepared for Denison Mines Limited and Rio Algom Limited, dated August 7, 1980	Nov. 12, 1980
G-108A	Appendix to "A Review of Long Term Environmental Considerations Associated With the Uranium Mines in Elliot Lake" relating to long term levels of radium-226, dated October 1, 1980	Nov. 12, 1980
G-108B	Paper entitled, "Surveillance du Radon Monitoring" by Letourneau from the NEA Specialist Meeting in November, 1978	Nov. 12, 1980
G-109	"Additional Information Provided for the Select Committee on Ontario Hydro Affairs", by Denison Mines Limited	Nov. 12, 1980
G-110	Documents and Information requested by the Select Committee on Ontario Hydro Affairs from Rio Algom Limited, dated October 8, 1980	Nov. 12, 1980
G-111	Letter addressed to Mr. Alan Schwartz, Counsel, The Select Committee on Ontario Hydro Affairs, from Atomic Energy Control Board regarding the 1978 Department of Justice legal opinion on Jurisdiction, dated October 6, 1980	Nov. 12, 1980
G-112	Letter addressed to Mr. A. Schwartz, Counsel, from Eldorado Nuclear Limited regarding Staff Presentation of October 2, 1980, dated October 9, 1980	

Exhibit #	Title	Date Tabled
G-113	Letter addressed to Mr. Alan Schwartz, Counsel, Select Committee on Ontario Hydro Affairs, from Ministry of Labour regarding Staff Presentation of October 2, 1980, dated October 21, 1980	Nov. 12, 1980
G-114	News Release 80-26 from Atomic Energy Control Board re: Site Approval Sought by Eldorado for Port Hope Refinery Expansion dated November 13, 1980	Nov. 20, 1980
G-115	News Release 80-27 from Atomic Energy Control Board re: Radiation Task Force Initiates Study on Remaining Waste in Port Hope, Ontario dated November 17, 1980	Nov. 20, 1980

APPENDIX E

LIST OF RECOMMENDATIONS

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RECOMMENDATION 1

The Government of Canada immediately take all steps necessary to test the validity of the federal adoption of the Ontario Occupational Health and Safety Act and regulations and in particular to bring the issue before the appropriate court.

RECOMMENDATION 2

If the Government of Canada fails to test the federal adoption of the Ontario Occupational Health and Safety Act the Attorney General of Ontario should, within three months of the tabling of this report immediately take all steps necessary to test the validity of the federal adoption of the Ontario Occupational Health and Safety Act and Regulations and in particular to bring the issue before the appropriate court.

RECOMMENDATION 3

AECB act and regulations should be amended to make it clear that licence conditions may be imposed in the interest of environmental protection and health and safety, that licence conditions may incorporate provincial laws and to give the AECB the necessary powers to impose penalties and carry on prosecutions in specific areas.

RECOMMENDATION 4

The AECB should occupy the field of conventional health and safety by incorporating Ontario's Occupational Health and Safety Act and regulations.

RECOMMENDATION 5

The AECB should occupy the environmental field for nuclear facilities by incorporating provincial requirements under applicable environmental statutes and specific technical requirements recommended by the provincial Ministry of the Environment and making compliance a licence condition.

RECOMMENDATION 6

The mining industry should actively accept the value of new skills and technologies available for sound mine planning. To further this acceptance, the Ministry of Labour should ensure that companies hire people with the most advanced skills. Specifically, both Denison Mines Limited and Rio Algom Mines Limited should each have a fully qualified rock mechanic on staff.

RECOMMENDATION 7

The Ministry of Labour should co-operate with the mining industry to develop and test alternatives to the current bonus system, as a step toward increasing the worker's approach to safety.

RECOMMENDATION 8	The Ministry of Labour should work with each mining company to develop a commitment to a specific target of superior safety performance. The mining industry in general should look to other heavy industries with superior safety performance to find new and more comprehensive approaches. The uranium mining companies specifically should commit themselves to achieving a higher level of safety than other Ontario mines.
RECOMMENDATION 9	The Ministry of Labour should take all steps necessary to enact a regulatory standard for silica. The AECB should endeavour to establish annual personal exposure limits and the accompanying codes of practice as soon as possible.
RECOMMENDATION 10	Both the uranium mining companies and the AECB should commit themselves to a substantial increase in testing and development of personal alpha dosimeters with their early adoption as a high priority.
RECOMMENDATION 11	The AECB should specify that its regulatory limit for annual personal exposure to radon and its daughter products be aggregated on a running twelve month basis.
RECOMMENDATION 12	The AECB's regulatory limit of 4 working level months per twelve month period should include exposures both at work and at home.
RECOMMENDATION 13	The AECB should require all uranium mining companies to educate workers regarding the risk of radiation and the use of radiation protection equipment and systems and periodically update the workers' information. To further this goal, the AECB should approve the contents of all training and refresher courses.
RECOMMENDATION 14	The AECB should require that uranium mining companies post up-to-date individual radiation exposures and work site concentrations in a visible location.
RECOMMENDATION 15	Current working level month limits should be maintained when the new aggregated standards are introduced. No action that could be interpreted as loosening radiation protection standards should be taken unless justified by the most current epidemiological studies, such as those being completed by Dr. Müller.
RECOMMENDATION 16	The AECB should give Denison Mines Limited a specific time limit for the conversion of its mill to the lamix process or one that provides equally acceptable environmental consequences.

RECOMMENDATION 17

The AECB should require uranium mining companies to initiate research on the absorption of radioactive elements in vegetation growing on tailings and downstream from effluent discharge. The research should identify the effects on both plant and animal life.

RECOMMENDATION 18

The AECB should establish a standard for concentrations of airborne radiation; the Ministry of Labour should establish standards for maximum allowable radiation levels at any housing site located on a mine property; and monitoring for these standards should be required in advance of construction and before location of any personnel.

RECOMMENDATION 19

The Ministry of the Environment should ensure the establishment of a public monitoring committee, made up of private citizens, including the Indian Band, in the Elliot Lake Area. The committee should receive all regular environmental monitoring information and all reports on unusual incidents of an actual or potentially harmful nature. Further, it should meet regularly with company and regulatory staffs and should provide a channel to the companies and regulators for community inquiries and complaints. Finally, it should report annually to the local municipal council and the Serpent River Indian Band.

RECOMMENDATION 20

The federal authorities should resolve the concerns of the Serpent River Indian Band with all possible haste.

RECOMMENDATION 21

The uranium mining companies should be directed to initiate research to substantiate their assertions that surface tailings piles create no long-term problems. Further, governments should be directed to initiate a more aggressive research program into alternative approaches to long-term problems. Finally, the uranium mining companies and the governments should immediately initiate joint research on separation and backfill.

RECOMMENDATION 22

The AECB should be empowered to establish a surety fund arrangement to be applied to each licenced uranium mining and milling operation. The funding should be based on the volume of material planned for the site, its specific nature and specific site conditions. Companies should receive credits against annual funding requirements in return for specific expenditures on long-term stabilization projects, and funding should be reduced as companies are able to establish effective long-term approaches. Funding should include provision for performance bonding as well as for meeting the long terms costs of monitoring and possible remedial action.

RECOMMENDATION 23

The Ontario Minister of the Environment should give direction and leadership at Elliot Lake by responding at the earliest opportunity to the many recommendations of the Environmental Assessment Board.

RECOMMENDATION 24

The AECB should ensure the installation of improved security fencing, prominently marked with appropriate warning signs, around the radioactive waste materials in Port Hope.

RECOMMENDATION 25

The Government of Ontario should urge the federal government to establish a nuclear waste management agency to deal with all waste products associated with the processing and use of nuclear material. The agency so established should be responsible for managing the research, approval and operating phases of the program and should be required to have each of its proposals subject to full public environmental assessments.

RECOMMENDATION 26

The Government of Canada should amend its environmental protection process to eliminate the exclusion of federal crown corporations from compulsory review.

RECOMMENDATION 27

The Federal Minister of the Environment should instruct the environmental assessment and review office to prepare a panel for an expeditious hearing on the proposed construction by Eldorado Nuclear Limited of a Uranium Hexafluoride Plant at Port Hope. Further, Eldorado Nuclear should voluntarily submit its plans to this review.

If the Federal Minister of the environment cannot assure a limited expeditious hearing, Eldorado Nuclear should proceed through the AECB licencing approach. This should be strengthened by providing for funding of public groups, public availability of all technical assessments, and an orderly schedule of public meetings to provide information, to answer inquiries and to respond to particular challenges. Further, the AECB should, in its final licencing decision, respond to all expressed public concerns and be prepared to reject the licence application if the public information process is not handled in a satisfactory manner.